

Heterogeneous Mission Accessibility Follow-On - Online Data Access (HMA-FO_ODA)

Design Justification File (DJF) - Software Validation Specification (SVS)

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| | | |

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1 Introduction

This document defines the Software Validation Specification (SVS) for the HMA-Follow-on Task-3 (HMA-FO) Online Data Access (ODA) system Reference Implementation. The HMA-FO ODA system Reference Implementation shall demonstrate the usage and the advantages of a Web Coverage Service (WCS) to access EO datasets. More specifically, the concepts introduced with the new OGC WCS 2.0 standard and the functionalities of the new WCS EO Application Profile (WCS EO AP) shall be demonstrated for its suitability in various online data access scenarios.

This document provides the definition of the Test Design, Test Cases, and Test Procedures identified for verifying and validating the ODA system Reference Implementation against the Software Requirements Specifications as defined in [AD14].

This document has been prepared according to the ESA ECSS-E-ST-40C standard, following the SVS DRD.

This document will be updated during the HMA-FO project taking into account possible updates of the WCS EO AP as output of the OGC WCS.SWG.

2 Applicable and reference documents

2.1.1.1 Applicable documents

- [AD1] ECSS Standard: Space Engineering – Software, Ref. ECSS-E-ST-40C, 6 March 2009
- [AD2] ECSS Standard: Space product assurance – Software product assurance, Ref. ECSS-Q-ST-80C, 6 March 2009
- [AD3] HMA-FO_ODA Requirements Baseline Document - Software System Specification (HMA-FO_ODA-RB-SSS_EOX, ver. 1.4, 2010-11-03)
- [AD4] HMA-FO_ODA Requirements Baseline Document – Technical Note (HMA-FO_ODA-RB-TN_EOX, ver.1.1, 2010-05-27)
- [AD5] OGC 09-146r1, GML Application Schema Coverages , ver. 1.0.0, 2010-10-27
- [AD6] OGC 09-110r3, WCS Interface Standard: Core, ver. 2.0.0, 2010-10-27
- [AD7] OGC 09-147r1, Web Coverage Service 2.0 Interface Standard - KVP Protocol Binding Extension, ver. 1.0.0, 2010-10-27
- [AD8] OGC 09-148r1, Web Coverage Service 2.0 Interface Standard - XML/POST Protocol Binding Extension, version 1.0.0, 2010-10-27
- [AD9] OGC 07-140, OGC WCS 2.0 Application Profile - Earth Observation, draft, 2010-10-27
- [AD10] OGC 10-147, OGC Web Coverage Service (WCS) 2.0 Interface Standard GeoTIFF Encoding Format Extension, ver. 0.0.1, 2010-07-06
- [AD11] Invitation to Tender ESRIN/AO/1-5949/09/I-LG – HMA Follow on activities, Frascati, 19th of January 2009
- [AD1] OGC 06-126r2, Compliance Test Language (CTL), ver. 0.6, 31/03/2009
- [AD12] OGC 10-157, Earth Observation Metadata profile of Observations & Measurements, ver. 0.2.0, 2010-11-11
- [AD13] OGC 07-011 The OpenGIS Abstract Specification Topic 6, Schema for coverage geometry and functions.
- [AD14] HMA-FO_ODA, Technical Specification - Software Requirements Specification, (HMA-FO_ODA-TS-SRS_EOX), ver. 1.2, 2010-11-26
- [AD15] HMA-FO_ODA, Design Definition File - Software Design Document, (HMA-FO_ODA-DDF-SDD_EOX) ver. 1.0, 2010-11-26
- [AD16] HMA-FO_ODA, Software User Manual, v.1.0, 2010-12-17

2.2 References

- [RD1] <http://www.mapserver.org/>, MapServer Homepage
- [RD2] <http://geoserver.org/display/GEOS/Welcome>, GeoServer Open Source
- [RD3] <http://www.deegree.org/>, deegree Homepage
- [RD4] <http://www.unidata.ucar.edu/projects/THREDDS/>, THREDDS Data Server Homepage
- [RD5] <http://www.osgeo.org/>, OSGeo Homepage
- [RD6] <http://www.osgeo.org/node/812>, News MapServer Incubation Graduation
- [RD7] <http://mapserver.org/introduction.html>, MapServer Introduction
- [RD8] <http://www.swig.org/>, SWIG Homepage
- [RD9] <http://www.python.org/>, Python Homepage
- [RD10] <http://svn.osgeo.org/mapserver/trunk/>, MapServer development source (svn)
- [RD11] <http://subversion.tigris.org/>, Subversion Homepage
- [RD12] <http://trac.osgeo.org/mapserver/>, MapServer issue tracker (trac)
- [RD13] <http://trac.edgewall.org/>, Trac Homepage
- [RD14] <http://www.mapserver.org/community/lists.html>, MapServer mailings lists
- [RD15] <http://www.gnu.org/software/mailman/>, Mailman Homepage
- [RD16] <http://www.mapserver.org/community/irc.html>, MapServer IRC
- [RD17] <http://sourceforge.net/>, SourceForge
- [RD18] <http://code.google.com/>, Google Code
- [RD19] OGC 07-118r8, User Management Interfaces for Earth Observation Services, version 1.0, 2010-09-08

3 Terms, definitions and abbreviated terms

| | |
|--------------------------|--|
| AP | Application Profile |
| CDS | Coordinated Data access System (GSCDA) |
| DJF | Design Justification File |
| EO | Earth Observation |
| EP | Extension Package |
| ESA | European Space Agency |
| GCM | GMES Contributing Mission |
| GDAL | Geospatial Data Abstraction Library |
| GMES | Global Monitoring for Environment and Security |
| GML | Geographic Markup Language (OGC) |
| GSCDA | GMES Space Component - Data Access |
| HMA | Heterogeneous Mission Accessibility |
| HMA-FO | HMA – Follow On |
| HMI | Human Machine Interface |
| ICD | Interface Control Document |
| KVP | Key-Value Pair |
| HMI | Human Machine Interface |
| ODA | Online Data Access |
| ODA system | HMA-FO Reference Implementation for Online Data Access utilizing WCS 2.0 and the WCS EO AP |
| OGC | Open Geospatial Consortium |
| OGR | OGR Simple Features Library |
| OSGeo | Open Source Geospatial Foundation |
| OSS | Open Source Software |
| Reference Implementation | A reference implementation is a fully functional implementation of a specification in reference to which other implementations can be evaluated. |

| | |
|-----------|--|
| RB | Requirements Baseline |
| SOAP | Simple Object Access Protocol, |
| SSE | Service Support Environment |
| TN | Technical Note |
| TS | Technical Specification |
| TS-SRS | Technical Specification- Software Requirements Specification |
| WCPS | Web Coverage Processing Service (OGC) |
| WCS | Web Coverage Service (OGC) |
| WCS EO AP | Web Coverage Service Earth Observation Application Profile |
| WCS-T | Web Coverage Service – Transactional (OGC) |
| WCTS | Web Coordinate Transformation Service (OGC) |
| WMS | Web Mapping Service(OGC) |
| WPS | Web Processing Service (OGC) |
| XML | Extensible Markup Language |

4 Software overview

This section describes the function and purpose of the HMA-FO Reference Implementation for the Online Data Access System (ODA system) providing also the context in which it is used and an overview of the architectural decomposition.

4.1 Function and purpose

This section describes the function and purpose of the software system and of the components which will be used to build it.

The ODA system shall provide easy online access to EO datasets utilizing the new WCS 2.0 OGC standard and the WCS EO Application Profile. Thereby it shall demonstrate the possibilities and the use of the enhanced functionalities (e.g. subsetting in space and time) available when compared to simple FTP access.

The HMA-FO Reference Implementation (hereafter also called ODA system) shall implement the following main functionalities and concepts:

- provide online access to EO datasets
- allow the subsetting of EO datasets
- allow the reprojection of EO dataset
- allow to access the EO datasets in different formats
- provide metadata for accessed EO datasets
- utilize OGC's WCS 2.0 standard
- utilize OGC's WCS EO AP (at current status, not yet a standard)
- prove the suitability of Open Source software tools

These functionalities and concepts shall be demonstrated by installing and configuring the ODA system at an online accessible server (TBD with ESA) with a representative set of EO data (TBD with ESA).

The HMA-FO Reference Implementation provided WCS Service endpoints shall be accessed from the WebMapView Client that within the frame of this project is being enhanced to support the WCS 2.0 and WCS EO AP protocols.

4.2 Components Overview

The Reference Implementation of the ODA system shall demonstrate an easy online access to EO datasets utilizing the new WCS 2.0 OGC standard and the WCS EO AP.

The Reference Implementation ODA system includes the following components:

Web Server, which provides the access point to the successive components and

performs a basic authentication of a user

- Server for WCS EO AP provides the first handling of the incoming request and supervises the request processing accordingly
- geo-RDBMS , a geo-enabled RDBMS which contains the coverage metadata and the access instructions to the datasets (e.g. contained in a Storage-Backend). The offered content has not necessarily be the full archives content. It also contains information about the dataset locations (e.g. File System structure) inside the archive as well as the access logic. It would also be possible that the archive is fully contained within a DBMS (e.g. in rasdaman).
- mapping Server enhanced with WCS 2.0 functionality
- Storage-Backend which represents the actual location of the datasets. This can be either internally (accessible via OS function, e.g. cpio) or an external archive location accessible via HTTP, FTP, or WCS protocol.
- Libraries for raster and vector data manipulation, provide backend functionalities to perform format conversions as well as CRS transformations

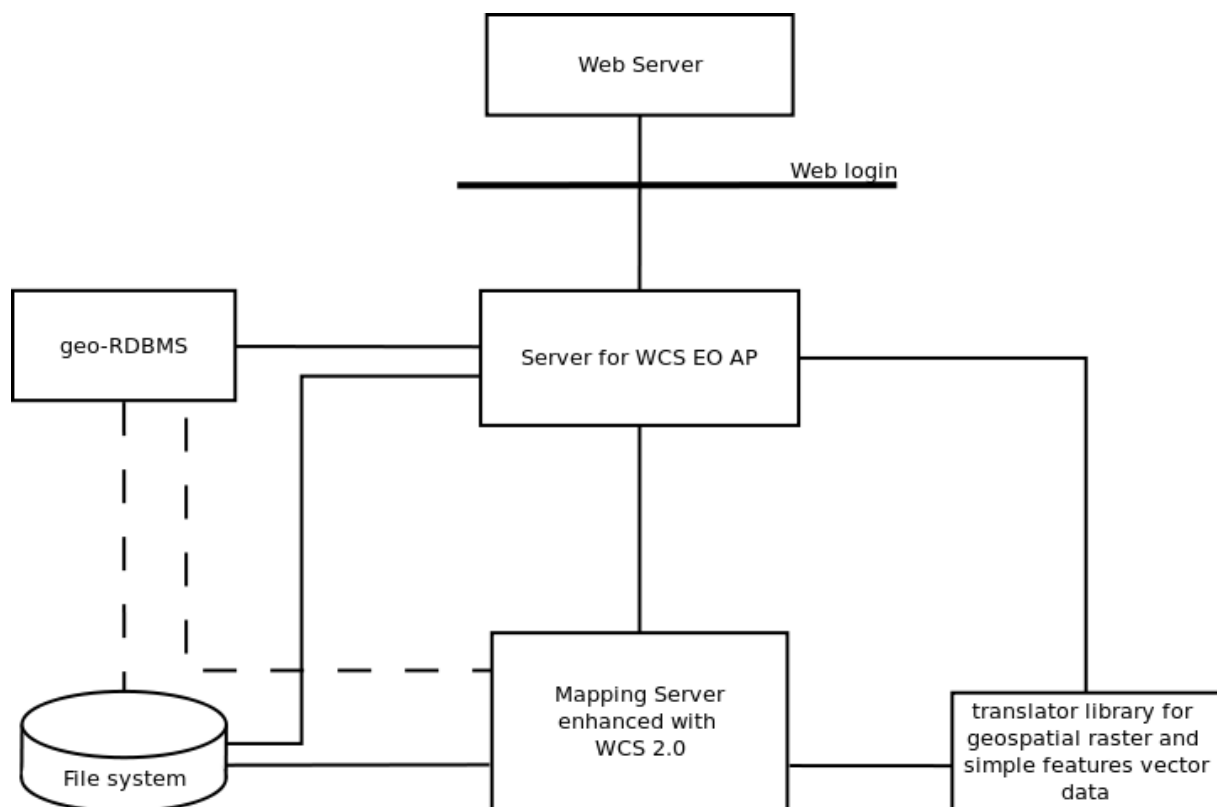


Figure 1: ODA system component diagram

The WebMapView client will access the ODA System using the WCS 2.0 and WCS EO AP

protocols. This WebMapView client is implemented as a Java Servlet and requires a Servlet container like Tomcat and a Java Runtime Environment 1.6 with the Java Advanced Imaging Extensions to run. For treating specialised coverage data formats, the GDAL library is additionally required. The enhanced WebMapView software relies on a Geospatially enabled Object Relational Database Management System (Oracle or PostgreSQL/PostGIS) for persisting the map configurations. A content Management System with user management, version control and usage statistics is integrated within the system. The WebMapView can be used standalone or it can be integrated within any portal supporting the JSR286 portlet specification.

4.3 Interfaces context

Error: Reference source not found shows the context of the ODA system (HMA-FO Reference Implementation) and which entities are having a relationship with it. The ODA system interacts with the following entities:

- WCS Client application, able to send WCS 2.0 [AD6] and WCS EO AP [AD9] compliant requests and to handle the responses correctly.
- File System containing the datasets (Archive). This represents the possibility that a file system is directly connected to the ODA system.
- Archive Server, these represent external Archives which can be accessed utilizing different protocols (HTTP, FTP, WCS) to access the datasets
- Operator of the ODA system is in charge of the operation and configuration of the system and for updating the dataset offerings, as well as for data ingestion into the ODA system's internal data storage.

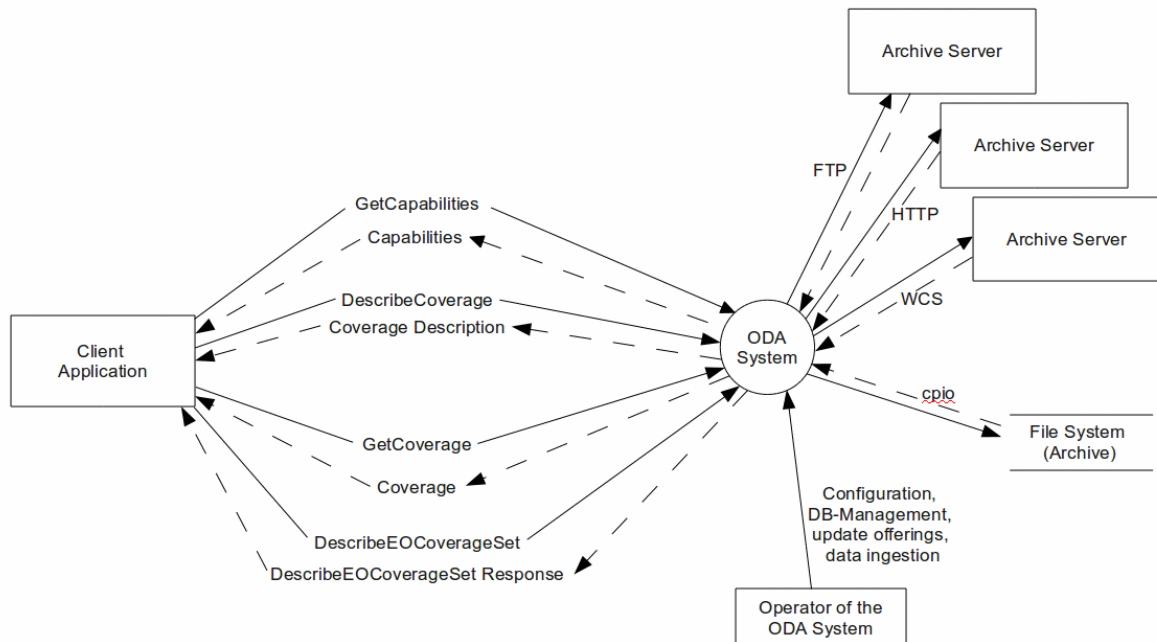


Figure 2: ODA system context diagram

The interfaces for communication between the components and entities as shown in Error: Reference source not found are:

- Client Application .- ODA system
 - WCS 2.0 [AD6] and WCS EO AP [AD9] act as ICD and define the requests and responses available
 - The User Management Interface [RD19] is not mentioned in the above diagram since for the HMA-FO Reference Implementation, described in this document, it shall not be applied.
- ODA system - Archive Server
 - To access external Archive Servers via FTP, HTTP, or WCS protocol
- ODA system - File System
 - The ODA system also foresees that datasets are available on an internal or external File System which may be accessed by calls directly to the Operating System (e.g. cpio).
- Operator - ODA system

- The Operator is in charge for the operation, configuration, and the DB-management of the ODA system. In addition, datasets may be ingested into the internal data storage.

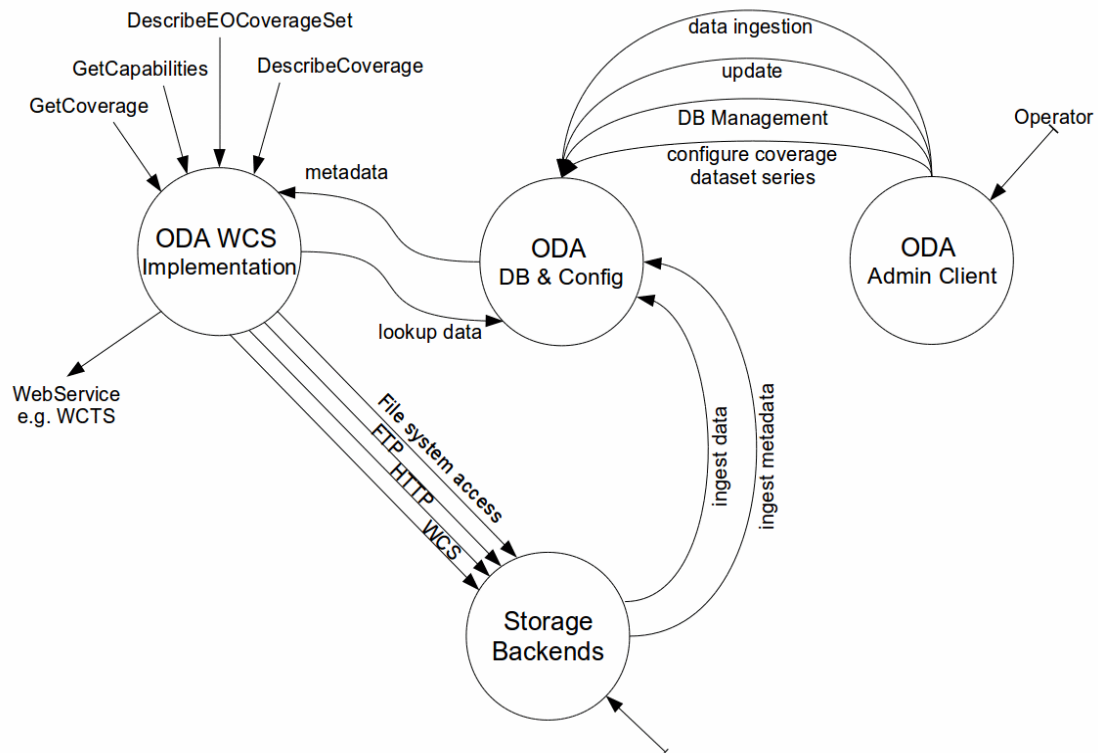


Figure 3: ODA system interface context

5 Software validation specification task identification

This section presents the approach to be used for validating the ODA system Reference Implementation software.

5.1 Task and criteria

The task includes the execution of test procedures, the analyzes of the test results and the writing of test reports (including reporting of possible problems).

5.2 Features to be tested

This document is in charge of verifying all requirements listed in [AD14] which show one of the following tags: E_Y, E_B, D_Y, D_B.

These tags have the following meaning:

- E Essential
- D Desirable
- Y will be implemented
- B will be implemented on a best effort basis

5.3 Features not to be tested

All requirements and features not reported in [AD14] or not showing one of the tags E_Y, E_B, D_Y, D_B, are out of the scope of this document.

5.4 Test pass - fail criteria

The pass - fail criterion depends on the validation method applied to each item.

The validation methods used are:

- D Demonstration: This verification method may be used when actual conduct can verify achievement of requirements such as service and access, and when the requirements have been implemented.
- T Test: A requirement may be verified by test alone if the form of the specification is such that the requirement can be directly measured.
- A Analyzes: This verification method implies use of analytical techniques (such as system engineering analyzes, statistics, mathematical modeling, and simulations) and shall be used to verify such requirements. This includes

requirements which are not implemented in the demonstrator.

- I Inspection: 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.

A Requirements vs. Test cases traceability matrix is provided in section 11.1 and a Test cases vs. Requirements traceability matrix is provided in section 11.2 .

The expected result of each test is given in the test procedure description, for any step.

A test shall be considered as "passed" if the received result is equivalent with the expected result.

A test shall be considered as "failed" if the received result is not equivalent with the expected result.

5.5 Items that cannot be validated by test

There are a number of requirements that cannot be verified by test or demonstration, but manual inspection is needed for verifying their achievement, e.g.:

- Design and implementation requirements specifying the re-use of software
- Verifying that the developed software is provided as OSS and that the code has been provided to an agreed repository
- The development process carried out according to ECSS standards
- etc.

A Requirements vs. Analysis, inspection, review matrix is provided in section 9 .

6 Software validation testing specification design

This section provides the Test Designs aimed to validate the ODA system Reference Implementation software.

For the identification of the Test Designs the following naming convention shall apply:

- TD_<TD_nnn>: <Title>
 - TD Code for Test Design
 - <TD_nnn>: 3 digits number (generally having a stepping interval of 10)
 - <Title> Title of the Test Design

6.1 TD_001: Installation & configuration

6.1.1 General

The design of this test deals with the building/compilation of the software, installation on the run time environment, the configuration and then start-up of the system.

6.1.2 Features to be tested

This test shall verify:

- the setup and installation and configuration instructions provided as part of the Software Users Manual ([AD16])
- the completeness of the software package (source files, scripts, configuration files) needed to build and run the system

6.1.3 Approach refinements

The aim of this test is to:

- install and setup the Reference Implementation
- configure the Reference Implementation to achieve a working system

The following test case has been identified:

- TC_001_001: Installation, configuration, start-up

6.2 TD_010: Online data access verification

6.2.1 General

The design of this test deals with verification of the correct handling of OGC's WCS 2.0 standard ([AD6]), the currently supported extensions, ([AD7], and [AD10]) and the WCS EO Application Profile ([AD9]).

6.2.2 Features to be tested

The aim of this test case is:

- to verify the correct management of the supported interfaces, extensions, and protocols as mentioned in 6.2.1
 - *GetCapabilities*
 - ACCEPTVERSIONS (negotiation of versions [highest possible will be used])
 - SECTIONS (request only certain sections of Capabilities Document)
 - UPDATESEQUENCE (date of last issued GetCapabilities request to receive document only if it has changed)
 - *DescribeCoverage*
 - *DescribeEOCoverageSet*
 - SUBSET (trim request to a subset only; subsetting in space and/or time)
 - *GetCoverage*
 - FORMAT=image/tiff (define output coverage format)
- to verify the handling of additional parameters (functionalities) which are currently not defined in extensions
 - MEDIATYPE=multipart/mixed (request coverage to be packed inside a GML file structure)
 - SUBSET (request only a subset of the offered coverage as output; subsetting in space)
 - OUTPUTCRS (define output projection)
 - SIZE (define coverage output size) or RESOLUTION (define output pixel resolution). These are mutually exclusive.
 - INTERPOLATION (handling of pixels during reprojection)
- and combinations thereof

6.2.3 Approach refinements

This test design is structured in a set of test cases each dealing with a single access

operation. Each operation will be verified by issuing a series of requests towards the defined collections with varying parameters (if applicable).

The successful accomplishment of <TD_001> is a prerequisite to perform this test.

The following test cases have been identified:

- TC_010_010: ODA - *GetCapabilities*
- TC_010_020: ODA - *DescribeCoverage*
- TC_010_030: ODA - *DescribeEOCoverageSet*
- TC_010_040: ODA - *GetCoverage*

6.3 TD_020: ODA Admin Client verification

6.3.1 General

The design of this test deals with verification of the functionalities provided by the ODA Admin Client.

6.3.2 Features to be tested

The aim of this test case is to:

- verify the operator access to the ODA Admin Client
- verify the ODA Admin Client HMI
- verify the DB Management functionality
- verify the data ingestion functionality
- verify the possibility to configure coverage dataset series into the ODA system
- verify the update functionality

6.3.3 Approach refinements

This test design is structured in a set of test cases of different complexity.

The successful accomplishment of <TD_001> is a prerequisite to perform this test.

The following test cases have been identified:

- TC_020_010: Connect to ODA Admin Client HMI interface
- TC_020_020: DB Management
- TC_020_030: Data ingestion
- TC_020_040: Configure coverage dataset series
- TC_020_050: Update ODA system

6.4 TD_030: WebMapView Client verification

6.4.1 General

The design of this test deals with verification of the functionalities provided by the WebMapView WCS Client.

6.4.2 Features to be tested

The aim of this test case is to:

- verify that the WebMapView is capable of interacting with a service that implements the WCS 2.0.0 core standard with the GeoTIFF data format
- verify that the WebMapView is capable of interacting with a service that implements the WCS EO AP core standard with dataset series
- verify the coverage symbology functionalities
- verify the WebMapView configuration functionality
- verify the coverage Download functionality

6.4.3 Approach refinements

This test design is structured in a set of test cases of different complexity.

The following test cases have been identified:

- TC_030_010: WebMapView WCS 2.0 Support
- TC_030_020: WebMapView Coverage functionalities
- TC_030_030: WebMapView EO AP support with dataset series and stiched mosaics

7 Software validation test case specification

This section provides the Test Cases aimed to validate the ODA system Reference Implementation software.

For the identification of the Test Cases the following naming convention shall apply:

- TC_<TD_nnn>_<TC_nnn>: <Title>
 - TC Code for Test Case
 - <TD_nnn> Test Design number the Test Case belongs to
 - <TC_nnn>: 3 digits number (generally having a stepping interval of 10)
 - <Title> Title of the Test Case

7.1 TC_001_001: Installation, configuration, start-up

7.1.1 Test case identifier

This Test Case deals with the building/compilation of the software, installation on the run time environment, the configuration and then start-up of the system.

The tests shall verify:

- the setup, installation, and configuration instructions provided as part of the Software Users Manual ([AD16])
- the completeness of the software package (source files, scripts, configuration files) needed to build and run the system
- verify the connection to the network (Internet)

7.1.2 Inputs specification

The following Table specifies configuration parameters for the ODA system

| Section | Configuration Parameter | Comment |
|---------------|-------------------------|--|
| [o3s.service] | http_service_url | the URL where GET KVP and POST XML OWS requests are expected |
| | services | a comma separated list of OGC Web Services to be published; defaults to WCS only |

7.1.3 Outputs specification

The outputs of this test case are:

- the successful building, installation, and configuration of all ODA subsystems
- the successful start-up of the ODA system

7.1.4 Test pass - fail criteria

The Test is considered as "failed", if either compilation, installation, or configuration errors occurred.

7.1.5 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14] section 5.6. The software set-up includes:

- Debian GNU/Linux operating system
- PostgreSQL with PostGIS extension (or SQLite with SpatiaLite extension)
- Python 2.6
- Apache HTTP server with mod_wsgi
- Various libraries like GDAL, libxml2, libtiff, libgeotiff, etc.

7.1.6 Special procedural constraints

None

7.1.7 Interfaces dependencies

None: this is the first test case to run.

7.2 TC_010_010: ODA - GetCapabilities

7.2.1 Test case identifier

This Test Case is in charge of verifying the compliance of the ODA system with the specification of the *GetCapabilities* request as defined in [AD6].

The tests shall verify:

- Version negotiation and version limitation (ACCEPTVERSIONS)
- Limited delivery of Capabilities document to requested sections (SECTIONS)
- Delivery Capabilities document only if changed since last request

(UPDATESEQUENCE)

- Return of a full valid Capabilities document as defined in [AD6]

Additionally it has to be verified whether the received requests are logged.

7.2.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-------|------------------------|--|---|
| #1a,b | <i>GetCapabilities</i> | supported version is requested a) to wcs-test instance b) to wcseo-test/ows instance | Capabilities Document as defined for the requested version |
| #2a,b | <i>GetCapabilities</i> | unsupported version is requested a) to wcs-test instance b) to wcseo-test/ows instance | <i>Capabilities Document for the next available version according to OWS Common version negotiation</i> |
| #3 | <i>GetCapabilities</i> | acceptversions - negotiation of versions highest possible will be used | <i>Capabilities Document with the highest possible version</i> |
| #4 | <i>GetCapabilities</i> | sections - request only certain sections of Capabilities Document | <i>Capabilities Document containing only requested sections</i> |
| #5 | <i>GetCapabilities</i> | updatesequence - date of last issued GetCapabilities request | <i>receive document only if it has changed</i> |

7.2.3 Test pass - fail criteria

The Test is considered as "failed", if a valid request does not return valid Capabilities document or an invalid request does not return an *ows:ExceptionReport*.

7.2.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.2.5 Special procedural constraints

None

7.2.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_030: Data ingestion

7.3 TC_010_020: ODA - DescribeCoverage

7.3.1 Test case identifier

This Test Case is in charge of verifying the compliance of the ODA system with the specification of the *DescribeCoverage* request as defined in [AD6].

The tests shall verify the:

- Return of a coverage metadata document (*wcs:CoverageDescriptions*) as defined in [AD6]
- Return of an Error message (*ows:ExceptionReport*) for non valid requests

Additionally it has to be verified whether the received requests are logged.

7.3.2 Inputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|-------------------------|--|---------------------------------|
| #1 | <i>DescribeCoverage</i> | valid <i>CoverageID</i> (of dataset) | <i>wcs:CoverageDescriptions</i> |
| #2 | <i>DescribeCoverage</i> | valid <i>CoverageID</i> (of stitched mosaic) | <i>wcs:CoverageDescriptions</i> |
| #3 | <i>DescribeCoverage</i> | invalid <i>CoverageID</i> | <i>ows:ExceptionReport</i> |
| #4 | <i>DescribeCoverage</i> | invalid <i>CoverageID</i> (using the <i>eoID</i> of a dataset series) | <i>ows:ExceptionReport</i> |

7.3.3 Test pass - fail criteria

The Test is considered as "failed", if a valid request does not return valid *wcs:CoverageDescriptions* or an invalid request does not return an *ows:ExceptionReport*

7.3.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.3.5 Special procedural constraints

None

7.3.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_030: Data ingestion

7.4 TC_010_030: ODA – DescribeEOCoverageSet

7.4.1 Test case identifier

This Test Case is in charge of verifying the compliance of the ODA system with the specification of the *DescribeEOCoverageSet* request as defined in [AD6].

The tests shall verify the:

- Return of a series of valid *CoverageDescriptions* for valid requests
 - including no subset
 - including a spatial and/or time subset with mode overlap
 - including a spatial and/or time subset with mode contain
- Return of a Error message (*ows:ExceptionReport*) for non valid requests

Additionally it has to be verified whether the received requests are logged.

7.4.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|------------------------------|--|--|
| #1 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> (using the CoverageID of a dataset) | <i>wcs:CoverageDescription</i> of dataset including EO-GML |
| #2 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> (using the CoverageID | <i>wcs:CoverageDescription</i> |

| No. | Request | Test Condition | Expected Output |
|-----|------------------------------|---|--|
| | | of a stitched mosaic) | <i>ion of stitched mosaic including EO-GML</i> |
| #3 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> (of dataset series) | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #4 | <i>DescribeEOCoverageSet</i> | invalid <i>eoID</i> | <i>ows:ExceptionReport</i> |
| #5 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] (of dataset series) | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #6 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] (of dataset series) with mode overlap | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #7 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] (of dataset series) with mode contain | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #8 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and invalid SUBSET[spatial] (of dataset series) | <i>ows:ExceptionReport</i> |
| #9 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[temporal] (of dataset series) | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #10 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[temporal] (of dataset series) with mode overlap | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #11 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[temporal] (of dataset series) with mode contain | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #12 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and invalid SUBSET[temporal] (of dataset series) | <i>ows:ExceptionReport</i> |
| #13 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] and valid SUBSET[temporal] (of dataset series) | series of <i>wcs:CoverageDescriptions including EO-GML</i> |
| #14 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] and valid SUBSET[temporal] (of dataset | series of <i>wcs:CoverageDescriptions including EO-GML</i> |

| No. | Request | Test Condition | Expected Output |
|-----|------------------------------|---|---|
| | | series) with mode overlap | |
| #15 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and valid SUBSET[spatial] and valid SUBSET[temporal] (of dataset series) with mode contain | series of <i>wcs:CoverageDescriptions</i> including <i>EO-GML</i> |
| #16 | <i>DescribeEOCoverageSet</i> | valid <i>eoID</i> and invalid SUBSET[spatial] and invalid SUBSET[temporal] (of dataset series) | <i>ows:ExceptionReport</i> |

7.4.3 Test pass - fail criteria

The Test is considered as "failed", if a valid request does not return valid *wcs:CoverageDescriptions* or an invalid request does not return an *ows:ExceptionReport*

7.4.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.4.5 Special procedural constraints

None

7.4.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_030: Data ingestion

7.5 TC_010_040: ODA - GetCoverage

7.5.1 Test case identifier

This Test Case is in charge of verifying the compliance of the ODA system with the specification of the *GetCoverage* request as defined in [AD6] and [AD9].

The tests shall verify:

- A coverage is returned and corresponds to the requested parameters for valid requests. The following parameter/value pairs and combinations thereof shall be tested:
 - format: image/tiff, image/jpeg
 - mediatype: not present or multipart/mixed
 - subset: trimming in x and y or lat and long
 - without CRS (original projection)
 - with CRS (reprojecting)
 - outputcrs: not present or CRS
 - size or resolution (mutual exclusive per axis)
 - interpolation (handling of pixels during reprojection)
- Return of an Error message (ows:ExceptionReport) for non valid requests

Additionally it has to be verified whether the received requests are logged.

7.5.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|--------------------|--|---|
| #1 | <i>GetCoverage</i> | valid CoverageID (of dataset), FORMAT missing | <i>ows:ExceptionReport</i> |
| #2 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic), FORMAT missing | <i>ows:ExceptionReport</i> |
| #3 | <i>GetCoverage</i> | invalid CoverageID | <i>ows:ExceptionReport</i> |
| #4 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff (or jpeg or png or gif) | coverage (of full dataset) in the respective image format |
| #5 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic) and valid FORMAT=image/tiff | coverage (of stiched mosaic) in the respective image format |
| #6 | <i>GetCoverage</i> | valid CoverageID (of dataset) and invalid FORMAT=image/bmp | <i>ows:ExceptionReport</i> |
| #7 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff (or jpeg or png or gif) and valid MEDIATYPE=multipart/mixed | coverage (of full dataset) in requested file format enclosed in |

| No. | Request | Test Condition | Expected Output |
|-----|--------------------|---|---|
| | | | GML structure |
| #8 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic) and valid FORMAT=image/tiff and valid MEDIATYPE=multipart/mixed | coverage (of stiched mosaic) in requested file format enclosed in GML structure |
| #9 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff (or jpeg or png or gif) and invalid MEDIATYPE=multipart/something | coverage (of full dataset) in requested file format (not enclosed in GML structure) |
| #10 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid SUBSET=x(2100,2300)&SUBSET=y(3870,4070) | coverage (of subsetted dataset) according to requested parameters |
| #11 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff (or jpeg or png or gif) and valid MEDIATYPE=multipart/mixed and valid SUBSET=x(2100,2300)&SUBSET=y(3870,4070) | coverage (of subsetted dataset) according to requested parameters enclosed in GML structure |
| #12 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic) and valid FORMAT=image/tiff and valid SUBSET=x(200,400)&SUBSET=y(380,580) | coverage (of subsetted stiched mosaic) according to requested parameters |
| #13 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff and invalid SUBSET=x(12100,1200)&SUBSET=y(13870,14070) | <i>ows:ExceptionReport</i> |
| #14 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid SUBSET=x,http://www.opengis.net/def/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSG/0/4326(48,48.3) | coverage (of subsetted and reprojected dataset) in requested file format |
| #15 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic) and valid FORMAT=image/tiff and valid SUBSET=x,http://www.opengis.net/def/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSG/0/4326(48,48.3) | coverage (of subsetted and reprojected stiched mosaic) according to requested parameters |
| #16 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid | coverage (of full |

| No. | Request | Test Condition | Expected Output |
|-----|-------------|---|--|
| | | FORMAT=image/tiff and valid OUTPUTCRS=http://www.opengis.net/def/crs/EPSSG/0/4326 | reprojected dataset) in requested file format |
| #17 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff and invalid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/99999(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) | <i>ows:ExceptionReport</i> |
| #18 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff and invalid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/99999(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/99999(48,48.3) | <i>ows:ExceptionReport</i> |
| #19 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid SIZE=x(200)&SIZE=y(200) | coverage (of full, resampled dataset) according to requested parameters |
| #20 | GetCoverage | valid CoverageID (of stitched mosaic) and valid FORMAT=image/tiff and valid SIZE=x(200)&SIZE=y(400) | coverage (of full, resampled stitched mosaic – axis with different size) according to requested parameters |
| #21 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid SUBSET=x(2100,2700)&SUBSET=y(3870,4470) and valid SIZE=x(200)&SIZE=y(400) | coverage (of subsetted, resampled dataset) according to requested parameters |
| #22 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) and valid SIZE=x(200)&SIZE=y(200) | coverage (of subsetted, resampled dataset) according to requested parameters |
| #23 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) and invalid SIZE=x(17.3)&SIZE=y(20) | <i>ows:ExceptionReport</i> |

| No. | Request | Test Condition | Expected Output |
|-----|--------------------|---|---|
| #24 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid RESOLUTION=x,m(100)& RESOLUTION=y,m(100) | coverage (of full dataset with changed pixel resolution) according to requested parameters |
| #25 | <i>GetCoverage</i> | valid CoverageID (of stiched mosaic) and valid FORMAT=image/tiff and valid RESOLUTION=x,m(500)& RESOLUTION=y,m(500) | coverage (of full stitched mosaic with changed pixel resolution and axis in different resolution) according to requested parameters |
| #26 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff and valid SUBSET=x(2100,2700)&SUBSET=y(3870,4470) and valid RESOLUTION=x(30)& RESOLUTION=y(30) | coverage (of subsetted dataset with changed pixel resolution) according to requested parameters |
| #27 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSG/0/4326(48,48.3) and valid RESOLUTION=x(0.00027)& RESOLUTION=y(0.00027) | coverage (of subsetted, reprojected dataset with changed pixel resolution) according to requested parameters |
| #28 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSG/0/4326(48,48.3) and invalid RESOLUTION=lat(0.00027)& RESOLUTION=lon(0.00027) | <i>ows:ExceptionReport</i> |
| #29 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSG/0/4326(48,48.3) and valid RESOLUTION=x(0.00027)& RESOLUTION=y(0.00027) and valid INTERPOLATION=NEAREST | coverage (of subsetted, reprojected dataset with changed pixel resolution) according to requested parameters |
| #30 | <i>GetCoverage</i> | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/E | coverage (of subsetted, reprojected dataset with changed pixel |

| No. | Request | Test Condition | Expected Output |
|-----|-------------|--|--|
| | | PSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) and valid RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027) and valid INTERPOLATION=BILINEAR | resolution) according to requested parameters |
| #31 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) and valid RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027) and valid INTERPOLATION=AVERAGE | coverage (of subsetted, reprojected dataset with changed pixel resolution) according to requested parameters |
| #32 | GetCoverage | valid CoverageID (of dataset) and valid FORMAT=image/tiff valid SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3) and invalid RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027) and invalid INTERPOLATION | <i>ows:ExceptionReport</i> |

7.5.3 Test pass - fail criteria

The Test is considered as "failed", if a valid request does not return a coverage according to the requested parameters or an invalid request does not return an *ows:ExceptionReport*

7.5.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.5.5 Special procedural constraints

None

7.5.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up

7.6 TC_020_010: Connect ODA Admin Client HMI interface

7.6.1 Test case identifier

This Test Case shall verify the correct functioning of the ODA Admin Client.

The tests shall verify:

- The availability of the ODA Admin client at a specific URL
- The successful connection with valid user credentials
- The successful denial of connection with invalid user credentials

7.6.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|---------|--------------------------|-----------------|
| #1 | Connect | valid user credentials | HMI interface |
| #2 | Connect | invalid user credentials | Error message |

7.6.3 Test pass - fail criteria

The Test is considered as "failed", if a valid user is not able to connect or an invalid user is able to connect.

7.6.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.6.5 Special procedural constraints

None

7.6.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform

this test:

- TC_001_001: Installation, configuration, start-up

7.7 TC_020_020: DB Management

7.7.1 Test case identifier

This Test Case deals with the DB Management in general, in particular with the parts not covered by TC_020_040 and TC_020_050.

The tests shall verify:

- the possibility to add and remove data from the database using the Admin Client

7.7.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|-------------------|--|--|
| #1 | add range type | configure new channel "alpha"; create "RGBA" range type | Message for successful registration |
| #2 | remove range type | remove "RGBA" range type | |

7.7.3 Test pass - fail criteria

The Test is considered as "failed", if the registration of new data in the database is not successful or the deletion of data from the database is not successful.

7.7.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.7.5 Special procedural constraints

None

7.7.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

-
- TC_001_001: Installation, configuration, start-up

7.8 TC_020_030: Data ingestion

7.8.1 Test case identifier

This Test Case shall verify that data can be successfully ingested in the ODA system.

The tests shall verify:

- The ingestion of test data in the local file-system
- Read access by the Apache HTTP server

7.8.2 Inputs/Outputs specification

The following Table specifies the test datasets to be ingested and registered for the test scenario. The final test datasets have to be agreed with ESA before the final AR.

| ID | Dataset | Comment |
|----------------|--|--|
| collection | 22 sample datasets from IMAGE2009 viewing different parts of Austria or close-by areas simulating a collection. | The resolution of the datasets have been recalculated in order not to show full details. |
| timeseries | 3 sample datasets from IMAGE2009 viewing the same geographic area (south-east Vienna) to simulate a time-series. | The resolution of the datasets have been recalculated in order not to show full details. |
| stitchedmosaic | stitched mosaic | TBD |

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|----------------------|---|--|
| #1 | Ingest test datasets | valid "collection" test data and directory accessible by the Apache HTTP server. | Copy command successfully finished and user under which the Apache HTTP server is running can read data. |
| #2 | Ingest test datasets | valid "timeseries" test data and directory accessible by the | Copy command successfully finished |

| No. | Request | Test Condition | Expected Output |
|-----|----------------------|---|--|
| | | Apache HTTP server. | and user under which the Apache HTTP server is running can read data. |
| #3 | Ingest test datasets | valid "stitchedmosaic" test data and directory accessible by the Apache HTTP server. | Copy command successfully finished and user under which the Apache HTTP server is running can read data. |

The test datasets have to be stored in directories accessible by the user under which the Apache HTTP server is running. Each defined set (row in the table above) shall be stored in a separate directory.

7.8.3 Test pass - fail criteria

The Test is considered as "failed", if the test data can not be stored in a directory that is accessible by the user under which the Apache HTTP server is running.

7.8.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.8.5 Special procedural constraints

None

7.8.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up

7.9 TC_020_040: Configure coverage dataset series and stitched mosaic

7.9.1 Test case identifier

This Test Case verifies that dataset series and stitched mosaics can be registered via the ODA Admin Client.

The tests shall verify:

- The configuration of dataset series and stitched mosaic

7.9.2 Inputs/Outputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|---------------------------|---|-------------------------------------|
| #1 | Configure dataset series | valid new eoID, EO Metadata, and image pattern (*.tiff). Directory of the "collection" test data. | Message for successful registration |
| #2 | Configure dataset series | valid new eoID, EO Metadata, and image pattern (*.tiff). Directory of the "timeseries" test data. | Message for successful registration |
| #3 | Configure stitched mosaic | valid new eoID, EO Metadata, and image pattern (*.tiff). Directory of the "stitchedmosaic" test data. | Message for successful registration |

7.9.3 Test pass - fail criteria

The Test is considered as "failed", if the ODA Admin Client does not respond with a successful registration message or the subsequent test cases (TC_010_010, TC_010_020, TC_010_030, and TC_010_040) do not show the registered data.

7.9.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.9.5 Special procedural constraints

None

7.9.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_010: Connect ODA Admin Client HMI interface
- TC_020_030: Data ingestion

7.10 TC_020_050: Update ODA system

7.10.1 Test case identifier

This Test Case deals with the update of the ODA system database, i.e. changes made in the configuration of the coverage and dataset series.

The tests shall verify:

- the update of the configuration of coverages and dataset series

7.10.2 Inputs specification

The following Table specifies the test requests sent to the ODA system and the expected outputs.

| No. | Request | Test Condition | Expected Output |
|-----|--------------------------|---|-------------------------------------|
| #1 | configure dataset series | create new dataset series; see TC_020_040 | Message for successful registration |
| #2 | configure dataset series | change EO metadata | Message for successful change |
| #3 | configure dataset series | set visibility of arbitrary dataset to True | Message for successful change |
| #4 | configure dataset series | change data dir and image pattern | Message for successful change |
| #5 | remove dataset series | remove dataset series | Message for successful deletion |

7.10.3 Test pass - fail criteria

The Test is considered as "failed", if the ODA Admin Client does not respond with the expected output or the subsequent test cases (TC_010_010, TC_010_020, TC_010_030, and TC_010_040) do not show the modifications in the data.

7.10.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.10.5 Special procedural constraints

None

7.10.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_010: Connect ODA Admin Client HMI interface
- TC_020_030: Data ingestion

7.11 TC_030_010: WebMapView WCS 2.0 Support

7.11.1 Test case identifier

This Test Case deals with the WebMapView Client of the ODA System. This Test Case verifies that the WebMapView can correctly issue WCS 2.0 GetCapabilities, describeCoverage and GetCoverage requests.

In addition it verifies that the WebMapView can be configured by a "Service Provider"

7.11.2 Inputs specification

The following Table specifies the tests steps that are executed and the expected outputs.

| No.(*) | Test Condition | Expected Output |
|--------|--|----------------------------|
| 10 | Provide WCS Service endpoint and connect to it: request capabilities | List of coverages is shown |

| No.(*) | Test Condition | Expected Output |
|--------|---|--|
| 12 | Select one of the layers and add it to the map: request DescribeCoverage and GetCoverage are executed | Coverage downloaded to the WebMapView server and presented on the map |
| 15 | A new GetCoverage request is executed | Coverage with a higher resolution downloaded to the WebMapView server and presented on the map |

(*) No is referring to the number of the step in the associated test procedure

7.11.3 Test pass - fail criteria

The Test is considered as "failed", if the ODA Web Client does not respond with the expected output

7.11.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.11.5 Special procedural constraints

None

7.11.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_010: Connect ODA Admin Client HMI interface
- TC_020_030: Data ingestion

7.12 TC_030_020: WebMapView Coverage functionalities

7.12.1 Test case identifier

This Test Case deals with the WebMapView Client of the ODA System. This Test Case verifies that the WebMapView can influence the symbology with which a coverage is portrayed. It is verified that this can be done by an enduser and by the service provider.

It is also verified that a user can download the coverages

7.12.2 Inputs specification

The following Table specifies the tests steps that are executed and the expected outputs.

| No.(*) | Test Condition | Expected Output |
|--------|---------------------------------------|--|
| 10 | Verify the colour type functionality | Image presented in grey scales |
| 11 | Verify the band mapping functionality | Image represented in false colour |
| 12 | Verify the transparency control | Image represented without the black border |
| 13-14 | Hide/show layer functionality | Image gets hidden/shown |
| 15 | Change opacity | Image gets presented in a semi-transparent fashion |
| 17 | Download functionality | Image file gets downloaded |

(*) No is referring to the number of the step in the associated test procedure

7.12.3 Test pass - fail criteria

The Test is considered as "failed", if the ODA WebMapView Client does not respond with the expected output

7.12.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.12.5 Special procedural constraints

None

7.12.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform

this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_010: Connect ODA Admin Client HMI interface
- TC_020_030: Data ingestion
- TC_030.010: WebMapView WCS 2.0 Support

7.13 TC_030_030: WebMapView EO AP support with dataset series and stitched mosaics

7.13.1 Test case identifier

This Test Case deals with the WebMapView Client of the ODA System. This Test Case verifies that the WebMapView can interact with services that implement the WCS EO AP profile and that the client provides the user controls to perform the DescribeEOCoverageSet operation.

7.13.2 Inputs specification

The following Table specifies the tests steps that are executed and the expected outputs.

| No.(*) | Test Condition | Expected Output |
|--------|---|--|
| 7 | The WCS client is able to detect dataset series from the capabilities | A specific screen is shown that allows the user to enter the BoundingBox and time window for the DescribeEOCoverageSet operation |
| 9 | The WCS client is able to execute the DescribeEOCoverageSet operation | A list of coverages contained within the Bounding Box and Time window are shown |
| 10 | The WCS client is able to execute the GetCoverage operation | The coverage (belonging to a dataset series) gets shown on the map |
| 12 | A new GetCoverage request is executed | The coverage gets shown on the map |
| 22 | A stitched mosaic dataset is added to the map | The stitched mosaic coverage gets shown on |

| No.(*) | Test Condition | Expected Output |
|--------|--|---|
| | | the map |
| 23 | A describeCoverage Request is executed | A form gets shown that displays the coverage metadata |
| 24 | A describeCoverage Request is executed | Metadata is exported in XML |

(*) No is referring to the number of the step in the associated test procedure

7.13.3 Test pass - fail criteria

The Test is considered as "failed", if the ODA WebMapView Client does not respond with the expected output

7.13.4 Environmental needs

Hardware and software set-up of the test platform as specified in [AD14].

7.13.5 Special procedural constraints

None

7.13.6 Interfaces dependencies

The successful accomplishment of the following test cases is a prerequisite to perform this test:

- TC_001_001: Installation, configuration, start-up
- TC_020_010: Connect ODA Admin Client HMI interface
- TC_020_030: Data ingestion

8 Software validation test procedures

This section provides the Test Procedures aimed to validate the ODA system Reference Implementation software.

For the identification of the Test Procedures the following naming convention shall apply:

- TP_<TD_nnn>_<TC_nnn>: <Title>
 - TP Code for Test Procedure
 - <TD_nnn> Test Design number the Test Case belongs to
 - <TC_nnn> Test Case number
 - <Title> Title of the Test Case

8.1 TP_001_001: Installation, configuration, start-up

8.1.1 Purpose

This test procedure implements the following test case:

- TC_001_001: Installation, configuration, start-up

8.1.2 Procedure Steps

Preconditions:

- Hardware and software set-up of the test platform as specified in [AD14].

Steps:

- Login to the workstation for the ODA system Reference Implementation
- Copy software from the source CDROM or download from HMA-FO_ODA consortium FTP-site
- Build and deploy the ODA system Reference Implementation as specified in [AD16]
- Adapt basic configuration to test workstation
- Start-up the ODA system Reference Implementation
- Verify that geo-RDBMS is started, up, and running
- Shutdown the ODA system Reference Implementation as specified in [AD16]
- Verify that all components of the ODA system are properly shutdown

8.1.3 Test script

None

8.2 TP_010_010: ODA - GetCapabilities

8.2.1 Purpose

This test procedure implements the following test case:

- TC_010_010: ODA - GetCapabilities

8.2.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to submit the test requests and visualize the test results

Steps:

- open the Web-Browser (Firefox / Internet Explorer are OK)
 - submit the following requests to the ODA system Reference Implementations.
Please note that currently two instantiations exist:
 - wcs-test (WCS 2.0.0 only)
 - wcseo-test/ows (WCS 2.0.0 + WCS 2.0 EO AP)
- #1a *http://hma.eox.at/wcs-test?*
service=wcs&version=2.0.0&request=GetCapabilities
- #1b *http://hma.eox.at/wcseo-test/ows?*
service=wcs&version=2.0.0&request=GetCapabilities
- #2a *http://hma.eox.at/wcs-test?*
service=wcs&version=1.3.0&request=GetCapabilities
- #2b *http://hma.eox.at/wcseo-test/ows?*
service=wcs&version=3.0.0&request=GetCapabilities
- #3 *http://hma.eox.at/wcseo-test/ows?*
service=wcs&version=2.0.0&request=GetCapabilities&acceptversions=2.0.0,
1.1.2,1.0.0
- #4 *http://hma.eox.at/wcseo-test/ows?*
service=wcs&version=2.0.0&request=GetCapabilities§ions=contents
- #5 *http://hma.eox.at/wcseo-test/ows?*
service=wcs&version=2.0.0&request=GetCapabilities&updatesequence="20
11-01-17"
- evaluate response between each submit
 - close Browser
 - login to ODA system
 - open text editor and load log-file to verify logging of requests

-
- logout of ODA system

8.2.3 Test script

None

8.3 TP_010_020: ODA - DescribeCoverage

8.3.1 Purpose

This test procedure implements the following test case:

- TC_010_020: ODA - DescribeCoverage

8.3.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to submit the test request and visualize the test results

Steps:

- open the Web-Browser (Firefox / Internet Explorer are OK)
- submit the following requests to the ODA system Reference Implementation
 - #1 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=DescribeCoverage&coverageid=Image
2009_Test_Scene_1*
 - #2 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeCoverage&coverageid=image
2009_mosaic*
 - #3 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=DescribeCoverage&coverageid=Image
2002_Test_Scene_1*
 - #4 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeCoverage&coverageid=image
2009_collection*
- evaluate response between each submit
- close Browser
- login to ODA system
- open text editor and load log-file to verify logging of requests

-
- logout of ODA system

8.3.3 Test script

None

8.4 TP_010_030: ODA – DescribeEOCoverageSet

8.4.1 Purpose

This test procedure implements the following test case:

- TC_010_030: ODA – DescribeEOCoverageSet

8.4.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to submit the test request and visualize the test results

Steps:

- open the Web-Browser (Firefox / Internet Explorer are OK)
- submit the following requests to the ODA system Reference Implementation
 - #1 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=collect
ion_080313P600320035L0040S4_rgb*
 - #2 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_mosaic*
 - #3 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection*
 - #4 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=Imag
e2002_Test_Scene_1*
 - #5 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326
(16.30,16.581987)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/432*

-
- 6(48.65,48.851644)
- #6 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326
(16.30,16.581987)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/432
6(48.65,48.851644)&containment=overlaps*
- #7 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326
(16.30,16.581987)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/432
6(48.65,48.851644)&containment=contains*
- #8 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long(16.581987,16.30)&subset=lat(48.851644,48.
65)*
- #9 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=time("2008-01-01","2008-03-31")*
- #10 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=time("2008-01-01","2008-03-
31")&containment=overlaps*
- #11 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=time("2008-01-01","2008-03-
31")&containment=contains*
- #12 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=time("2008-01-01","2008-31-31")*
- #13 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326
(12.0,17.0)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/4326(47.3
5,48.85)&subset=time("2009-03-01","2009-08-31")*
- #14 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326
(12.0,17.0)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/4326(47.3
5,48.85)&subset=time("2009-03-01","2009-08-31")&containment=overlaps*
- #15 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image*
-

2009_collection&subset=long,http://www.opengis.net/def/crs/EPSG/0/4326(12.0,17.0)&subset=lat,http://www.opengis.net/def/crs/EPSG/0/4326(47.35,48.85)&subset=time("2009-03-01","2009-08-31")&containment=contains

#16 http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=DescribeEOCoverageSet&EOID=image
2009_collection&subset=x,http://www.opengis.net/def/crs/EPSG/0/3035(4650000,4630000)&subset=y,http://www.opengis.net/def/crs/EPSG/0/3035(2850000,2859000)&subset=time("2008-01-01","2008-31-31")

- evaluate response between each submit
- close Browser
- login to ODA system
- open text editor and load log-file to verify logging of requests
- logout of ODA system

8.4.3 Test script

None

8.5 TP_010_040: ODA - GetCoverage

8.5.1 Purpose

This test procedure implements the following test case:

- TC_010_040: ODA - GetCoverage

8.5.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to submit the test request and visualize the test results
- gdalinfo for GeoTIFF inspection

Steps:

#1 http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1

#2 http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009_mosaic

-
- #3 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
2_Test_Scene_1*
 - #4 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff*
 - #5 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009
_mosaic&FORMAT=image/tiff*
 - #6 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/bmp*
 - #7 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&mediatype=multipart/mixed*
 - #8 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009
_mosaic&FORMAT=image/tiff&mediatype=multipart/mixed*
 - #9 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&mediatype=multipart/something*
 - #10 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x(2100,2300)&SUBSET=y(3
870,4070)*
 - #11 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&mediatype=multipart/mixed&subset=
x(2100,2300)&subset=y(3870,4070)*
 - #12 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009
_mosaic&FORMAT=image/tiff&subset=x(200,400)&subset=y(380,580)*
 - #13 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&subset=x(12100,12300)&subset=y(1
3870,14070)*
 - #14 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326(48,48.3)*
-

-
- #15 *http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009
_mosaic&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/E
PSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EP
SG/0/4326(48,48.3)*
- #16 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&OutputCRS=http://www.opengis.net/
def/crs/EP
SG/0/4326*
- #17 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EP
SG/0/99999(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/
EP
SG/0/4326(48,48.3)*
- #18 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EP
SG/0/99999(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/
EP
SG/0/99999(48,48.3)*
- #19 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&size=x(200)&size=y(200)*
- #20 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&size=x(200)&size=y(200)*
- #21 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x(2100,2700)&SUBSET=y(3
870,4470)&size=x(200)&size=y(400)*
- #22 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EP
SG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326(48,48.3)&SIZE=x(200)&SIZE=y(200)*
- #23 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EP
SG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326(48,48.3)&SIZE=x(17.3)&SIZE=y(20)*
- #24 *http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200*
-

-
- 9_Test_Scene_1&FORMAT=image/tiff&RESOLUTION=x(100)&RESOLUTION=y(100)
- #25 [http://hma.eox.at/wcseo-test/ows?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009
_mosaic&FORMAT=image/tiff&resolution=x\(500\)&resolution=y\(500\)](http://hma.eox.at/wcseo-test/ows?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=image2009_mosaic&FORMAT=image/tiff&resolution=x(500)&resolution=y(500))
- #26 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x\(2100,2700\)&SUBSET=y\(3
870,4470\)&resolution=x\(30\)&resolution=y\(30\)](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x(2100,2700)&SUBSET=y(3870,4470)&resolution=x(30)&resolution=y(30))
- #27 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPSSG/0/4326\(17,17.4\)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326\(48,48.3\)&RESOLUTION=x\(0.00027\)&RESOLUTION=y\(0.00027\)](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027))
- #28 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPSSG/0/4326\(17,17.4\)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326\(48,48.3\)&RESOLUTION=lat\(0.00027\)&RESOLUTION=lon\(0.000
27\)](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=lat(0.00027)&RESOLUTION=lon(0.00027))
- #29 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPSSG/0/4326\(17,17.4\)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326\(48,48.3\)&RESOLUTION=x\(0.00027\)&RESOLUTION=y\(0.00027\)
&interpolation=nearest](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027)&interpolation=nearest)
- #30 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPSSG/0/4326\(17,17.4\)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326\(48,48.3\)&RESOLUTION=x\(0.00027\)&RESOLUTION=y\(0.00027\)
&interpolation=bilinear](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027)&interpolation=bilinear)
- #31 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d
ef/crs/EPSSG/0/4326\(17,17.4\)&SUBSET=y,http://www.opengis.net/def/crs/E
PSG/0/4326\(48,48.3\)&RESOLUTION=x\(0.00027\)&RESOLUTION=y\(0.00027\)
&interpolation=average](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027)&interpolation=average)
- #32 [http://hma.eox.at/wcs-test?
service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image200
9_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/d](http://hma.eox.at/wcs-test?service=wcs&version=2.0.0&request=GetCoverage&CoverageId=Image2009_Test_Scene_1&FORMAT=image/tiff&SUBSET=x,http://www.opengis.net/def/crs/EPSSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EPSSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027)&interpolation=nearest)
-

*ef/crs/EPSG/0/4326(17,17.4)&SUBSET=y,http://www.opengis.net/def/crs/EP
PSG/0/4326(48,48.3)&RESOLUTION=x(0.00027)&RESOLUTION=y(0.00027)
&interpolation*

- evaluate response between each submit
- close Browser
- login to ODA system
- open text editor and load log-file to verify logging of requests
- logout of ODA system

8.5.3 Test script

None

8.6 TP_020_010: Connect ODA Admin Client HMI interface

8.6.1 Purpose

This test procedure implements the following test case:

- TC_020_010: Connect ODA Admin Client HMI interface

8.6.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to access the ODA Admin Client

Steps:

- open the Web-Browser (Firefox / Internet Explorer are OK)
- connect to the ODA system Reference Implementation Admin client at <http://hma.eox.at/wcseo-test/admin/>
- fill in the form with Username: "admin" and Password: "admin" and submit it with the "Log in" button
- inspect the resulting web page for successful login (see Figure 4 for reference)

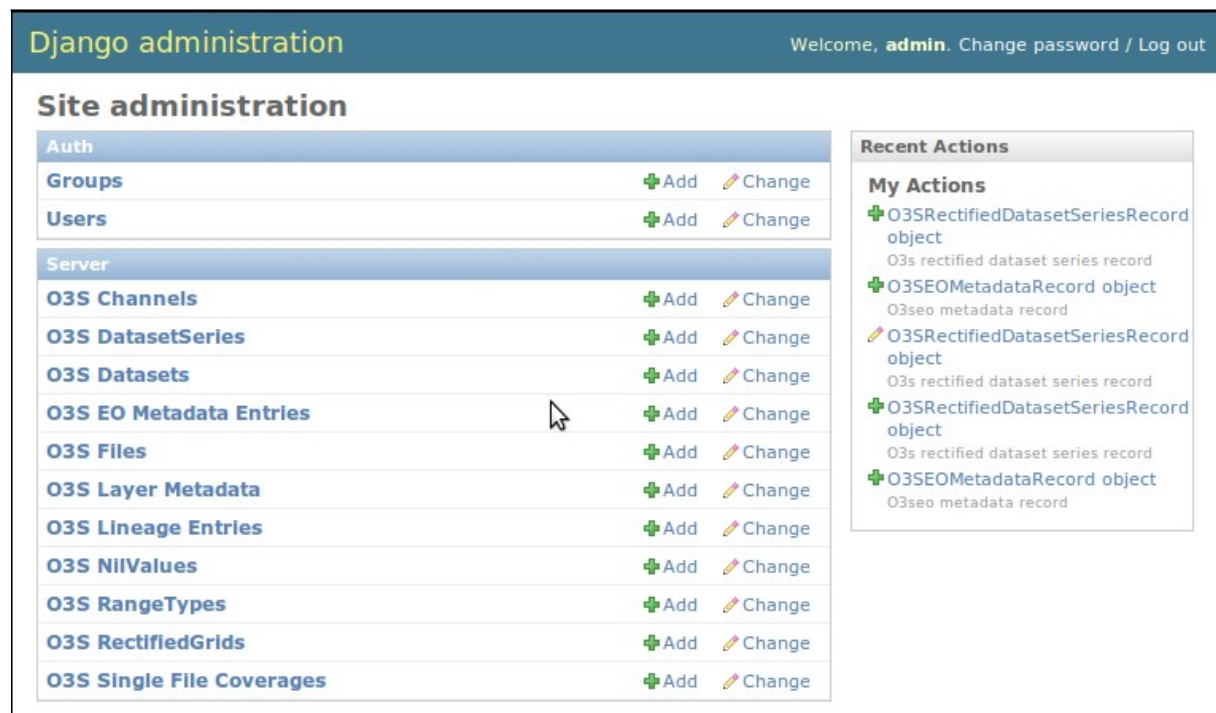


Figure 4: ODA Admin Client after successful log in

- fill in the form with Username: "admin" and Password: "wrong" and submit it with the "Log in" button
- inspect the resulting web page for error message explaining denial of access

8.6.3 Test script

None

8.7 TP_020_020: DB Management

8.7.1 Purpose

This test procedure implements the following test case:

- TC_020_020: DB Management

8.7.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to access the ODA Admin Client
- The login step of the test procedure "TP_020_010: Connect ODA Admin Client HMI

interface" shall have been successfully accomplished and the resulting web page still available in the Web-Browser (see Figure 4)

Steps:

- click on the "Add" button next to "O3S Range Types"
- fill in the field "Name": "RGBA"
- in the "O3S RangeType 2 channels" panel, select the "red" channel as no "1"
- click three times on "Add another O3S Range Type2 Channel"
- select the "green" channel as no "2"
- select the "blue" channel as no "3"
- click on the "Add" symbol next to the selection field in the last row; a window shall pop up that allows to insert channel data:
 - name: "alpha"
 - identifier: "alpha"
 - description: "Alpha channel of RGBA images"
 - definition: "http://www.opengis.net/def/property/OGC/0/Radiance"
 - uom: "W m2- sr-1"
 - allowed values start: "0"
 - allowed values end: "255"
 - allowed values significant figures: "3"
- click on the "Save" button
- verify that the "alpha" channel is now present in the selection box and select it
- click on the "Save" button
- verify that the "RGBA" range type is now present on the "O3S RangeTypes" view
- check the check-box next to the "RGBA" entry
- select "Delete selected O3S RangeTypes" from the "Action" selection box
- click on "Go"
- verify that the "RGBA" range type has been deleted from the "O3S RangeTypes" view

8.7.3 Test script

None

8.8 TP_020_030: Data ingestion

8.8.1 Purpose

This test procedure implements the following test case:

- TC_020_030: Data ingestion

8.8.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running

Steps:

- Login to the workstation for the ODA system Reference Implementation
- Copy test data from the source CDROM or download from HMA-FO_ODA consortium FTP-site.
- Verify that user under which the Apache HTTP server is running has read access to the test data files and directories by inspecting the output of the command "ls -l".

8.8.3 Test script

None

8.9 TP_020_040: Configure coverage dataset series and stitched mosaic

8.9.1 Purpose

This test procedure implements the following test case:

- TC_020_040: Configure coverage dataset series and stitched mosaic

8.9.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to access the ODA Admin Client
- The steps of the test procedure "TP_020_030: Data ingestion" shall have been successfully accomplished

- The login step of the test procedure "TP_020_010: Connect ODA Admin Client HMI interface" shall have been successfully accomplished and the resulting web page still available in the Web-Browser (see Figure 4)

Steps:

- use Web-Browser in state after successful login to ODA Admin Client (see Figure 4)
- select "O3S DatasetSeries" (screen should look similar to figure below)

- select "Add O3S DatasetSeries" at the top right

- enter valid values
 - EoID: image2009_collection
 - Eo metadata:
 - Image pattern: *.tiff
 - Dir: <directory to test dataset "collection">
Note: For each file in "Dir" adhering to "Image pattern" a O3S Datasets will automatically be registered
- save/register the new O3S DatasetSeries (save button lower right)
- verify the successful registration by viewing the saved O3S DatasetSeries

| Coverage id | Range type | Eo id | Eo metadata | Lineage | Grid | File | Automatic | Visible | Layer metadata | Delete? |
|------------------------------------|------------|------------------------------------|----------------------------|-------------------------|----------------------|----------------------|-------------------------------------|--------------------------|----------------|--------------------------|
| collection_090406P600330035L000054 | RGB | collection_090406P600330035L000054 | O3SEOMetadataRecord object | O3SLineageRecord object | 7 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| collection_080828P600320036L000054 | RGB | collection_080828P600320036L000054 | O3SEOMetadataRecord object | O3SLineageRecord object | 8 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| collection_080313P600320035L004054 | RGB | collection_080313P600320035L004054 | O3SEOMetadataRecord object | O3SLineageRecord object | 9 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| collection_090415P600330034L000054 | RGB | collection_090415P600330034L000054 | O3SEOMetadataRecord object | O3SLineageRecord object | 10 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| collection_080622P600330034L003054 | RGB | collection_080622P600330034L003054 | O3SEOMetadataRecord object | O3SLineageRecord object | 11 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |
| collection_080509P600290034L000054 | RGB | collection_080509P600290034L000054 | O3SEOMetadataRecord object | O3SLineageRecord object | 12 O3S RectifiedGrid | O3SFileRecord object | <input checked="" type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> |

- repeat steps above for test dataset "timeseries"
- repeat steps above for test dataset "stitchedmosaic" but with "O3S StitchedMosaic"

8.9.3 Test script

None

8.10 TP_020_050: Update ODA system

8.10.1 Purpose

This test procedure implements the following test case:

- TC_020_050: Update ODA system

8.10.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running
- A standard Web-Browser shall be available to access the ODA Admin Client
- The steps of the test procedure "TP_020_030: Data ingestion" shall have been successfully accomplished
- The login step of the test procedure "TP_020_010: Connect ODA Admin client HMI interface" shall have been successfully accomplished and the resulting web page still available in the Web-Browser (see Figure 4)

Steps:

- follow the test steps of TP_020_040 to create a new dataset series with the following metadata:
 - Eo id: image2009_test_collection
 - Eo metadata:
 - Image pattern: *.tiff
 - Dir: <directory to test dataset "collection">
Note: For each file in "Dir" adhering to "Image pattern" a O3S Dataset will automatically be registered
- run the steps of TP_010_010 to verify that a <wcseo:DatasetSeriesSummary> element for the dataset series is present in the GetCapabilities response in section <wcseo:Contents>
- change EO metadata of dataset series "image2009_test_collection" by clicking on the plus sign next to the EO metadata combo box and specifying a new set of metadata
- verify the successful registration
- run the steps of TP_010_030 to verify that the EO Metadata has changed according to the changes made in the database
- go to the dataset series view of "image_2009_test_collection"
- set visibility of arbitrary dataset of dataset series "image2009_test_collection" to true by checking the check-box in the "Visible" column
- press the "Save" button in the lower right corner
- run the steps of TP_010_010 to verify that a <wcs:CoverageSummary> element for the dataset is present in the GetCapabilities response in section <wcseo:Contents>
- go to the dataset series view of "image_2009_test_collection"
- change image pattern of dataset series "image2009_test_collection" to "*.tif"
- press the "Save" button in the lower right corner
- verify that the datasets have been removed automatically from the dataset series by going to the dataset series view of "image_2009_test_collection"
- change image pattern of dataset series "image2009_test_collection" to "*.tiff"; change data dir the directory that holds the "time-series" data
- press the "Save" button in the lower right corner
- verify that the dataset series now contains the time-series datasets by going to the dataset series view of "image_2009_test_collection"
- remove dataset series "image2009_test_collection" by clicking on the delete button in the lower left corner of the dataset series view
- verify the successful deletion

8.10.3 Test script

None

8.11 TP_030_010: WebMapView WCS 2.0 Support

8.11.1 Purpose

This test procedure implements the following test case:

- TC_030_010: WebMapView WCS 2.0 Support

8.11.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running and shall implement services that comply with the WCS 2.0 standard
- The coverages delivered by the ODA system Reference Implementation shall be supported by the WebMapView Client (supported by JAI or GDAL)
- A standard Web-Browser shall be available to access the WebMapView Client.
- This browser shall allow session cookies and have javascript enabled.

Steps:

1. Browse to the WebMapViews CMS homepage: (currently available at <http://einstein.gim.be/specto2/>)
2. Click on the login button on the top right of the window
3. Supply the administrator credentials
4. Perform a Search for the HMAFO Map Configuration by using the Search functionality at the top right and click then on the HMA FO link (or click on the HMAFO entry in the New Documents or recent Modifications)- this will open the HMA FO map template
5. In the menu bar, point the mouse to the HMA-FO menu item and click on "Clone" and provide a name for the new map configuration (e.g. TP030.10)
6. In the menu bar, point the mouse to the TP030.10 menu item and click on Edit.
7. In the "Table Of content pannel" to the left of the window, click on green plus icon that appears next to the "Layers" Label
8. In the form that appears select, "Create a new layer from a remote Service" and click on the next button.
9. In the form that appears click on the "Define a Service" label

-
10. Select then WCS as "Type" and set the Version to "2.0.0" and provide a URL to the WCS 2.0 Service endpoint: <http://hma.eox.at/wcs-test?>
 11. Click on Next – the WebMapView will now be downloading the WCS 2.0 capabilities
 12. In the form that appears select one of the layers (e.g. Image2009_Test_Scene_1) and click on apply
 13. Click on save
 14. The map will appear.
 15. Zoom to the location of the satellite image using one of the navigation controls

8.11.3 Test script

None

8.12 TP_030_020: WebMapView Coverage Functionality

8.12.1 Purpose

This test procedure implements the following test case:

- TC_030_020: WebMapView Coverage functionalities

8.12.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running and shall implement services that comply with the WCS 2.0 standard
- The coverages delivered by the ODA system Reference Implementation shall be supported by the WebMapView Client (supported by JAI or GDAL)
- A standard Web-Browser shall be available to access the WebMapView Client.
- This browser shall allow session cookies and have javascript enabled.
- TP030_010 has been executed

Steps:

1. Point the Mouse to the TP3010 menu item and select the "Edit functionality".
2. In the TOC pannel select the previously added layer and go to the tools tab and ensure that the Change style and export layer check boxes are selected
3. Subsequently click on the arrow in front of the layer name and then click on the

Plus icon next to the Styles entry that has appeared in the TOC

4. In the form that appears, select the symboliser style and give it a name (e.g style 1) and a title and ensure that the editable check box is selected.
5. In the TOC, then click on the Style1 entry, click on the plus icon next to the Symbolisers entry then opt to add a "channel Symboliser"
6. Select the layer in the TOC and within the rendering tab set the name to style1
7. Click on the save button
8. Zoom in on the image on the map
9. Goto the layer manager control to the right of the window
10. Click on the coverage layer
11. Click on the style link
12. Set the colour type to "Gray scales" and click on apply
13. Click again on the style link, set the color type to RGB and set the band mapping to 321 for RGB and click on Apply
14. Click again on the style link, set the transparent colour to black (#000000) and click on Apply
15. In the layer manager click on the hide layer button
16. In the layer manager click on the show layer button
17. In the layer manager move the opacity slider
18. In the layer manager click on the export coverage button
19. Specify a set of parameters and click on download.
20. Go to the configurator (by clicking on the Edit submenu icon under the TP03010 menu icon) and click on the name of the Map Context
21. Go to the tools tab, select the add layer functionality and click on "Save"
22. In the layer manager click on the plus icon to the right of the layer managers caption
23. In the wizard that appears enter one of the WCS URLs
(e.g. <http://hma.eox.at/wcs-test?>), select a coverage and click on apply

8.12.3 Test script

None

8.13 TC_030_030: WebMapView EO AP support with dataset series and stitched mosaics

8.13.1 Purpose

This test procedure implements the following test case:

- TC_030_030: WebMapView EO AP support with dataset series

8.13.2 Procedure Steps

Precondition:

- The ODA system Reference Implementation shall be up and running and shall implement services that comply with the WCS EO AP and shall be offering dataset series
- The coverages delivered by the ODA system Reference Implementation shall be supported by the WebMapView Client (supported by JAI or GDAL)
- A standard Web-Browser shall be available to access the WebMapView Client.
- This browser shall allow session cookies and have javascript enabled.
- TP030_010 has been executed

Steps:

1. Point the Mouse to the TP3010 menu item and select the "Edit functionality".
2. In the "Table Of content panel" to the left of the window, click on green plus icon that appears next to the "Layers" Label
3. In the form that appears select, "Create a new layer from a remote Service" and click on the next button.
4. In the form that appears click on the "Define a Service" label
5. Select then WCS as "Type" and set the Version to "2.0.0" and provide a URL to the WCS EO AP endpoint that offers Dataset series: <http://hma.eox.at/wcseo-test/ows?>
6. Click on Next – the WebMapView will now be downloading the WCS 2.0 capabilities
7. In the form that appears select one of the layers (e.g. Image2009_Collection) and click on apply
8. Click on the map that is shown to be able to define a Bounding Box in the form that appears and click on close
9. Refine the time extent and click on next
10. Select one of the list layers and click on apply

-
11. The map will appear with the selected coverage displayed.
 12. Zoom to the location of the satellite image using one of the navigation controls
 13. Point the Mouse to the TP3010 menu item and select the "Edit functionality".
 14. In the "Table Of content panel" to the left of the window, click on green plus icon that appears next to the "Layers" Label
 15. In the form that appears select, "Create a new layer from a remote Service" and click on the next button.
 16. In the form that appears click on the "Define a Service" label
 17. Select then WCS as "Type" and set the Version to "2.0.0" and provide a URL to the WCS EO AP endpoint that offers stitched mozaics: Point the Mouse to the TP3010 menu item and select the "Edit functionality".
 18. In the "Table Of content panel" to the left of the window, click on green plus icon that appears next to the "Layers" Label
 19. In the form that appears select, "Create a new layer from a remote Service" and click on the next button.
 20. In the form that appears click on the "Define a Service" label
 21. Select then WCS as "Type" and set the Version to "2.0.0" and provide a URL to the WCS EO AP endpoint (e.g.
<http://einstein.gim.be:8080/schemas/Test/stichedWCS.xml>.)
 22. Select one of the available mozaic layers and click on save
 23. Open the layer manager for the stitched mozaic layer and click on the download metadata button
 24. Click subsequently on the download button.

8.13.3 Test script

None

9 Software validation analysis, inspection, review of design

This section reports the manual steps to be performed for verifying requirements for which the validation method given is "A" (Analyzes) or "I" (Inspection).

| WCS server requirements | | | | |
|-------------------------|--|---------|------|--|
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_GEN_012 | The ODA system shall allow the communication and data exchange with other online services (e.g. service chaining with web service) | D | D_N | SOAP is not implemented in the Reference Implementation, only OGC standard interfaces are currently available. Extension at a later stage possible. |
| SR_ODA_GEN_020 | The ODA system shall allow SOAP binding. | D | E_N | SOAP is not implemented in the Reference Implementation. Extension at a later stage possible. |
| SR_ODA_GEN_030 | The ODA system shall be usable in subscription scenarios. | D | E_Y | Subscription is not seen as a functionality of the ODA system. WCS conformant requests received by HMA Ordering service will be handled accordingly. |
| SR_ODA_GEN_040 | The ODA system shall respect security and access control mechanisms based on [RD19]. | D | E_B | HMA Security Access Control not implemented in Reference Implementation. Extension at a later stage possible. |

| | | | | |
|----------------|--|---|-----|--|
| SR_ODA_CAP_060 | The ODA system shall allow to combine the ODA system with other services. Note: This includes receiving an input from a service, either by Reference or the real values, as well as forwarding the output of the ODA system to a service, either by Reference or the real values. | D | E_B | Not implemented in Reference Implementation. SOAP is not implemented in the Reference Implementation. Extension at a later stage possible. |
| SR_ODA_CAP_120 | The ODA system shall be able to receive/handle information from an compliant Order service. | D | E_B | Information received via OGCs WCS standard interfaces will be handled accordingly. |
| SR_ODA_CAP_200 | The ODA system shall be able to be configured dynamically (e.g. based on DB input) to enable the instantiation of "virtual WCS" (timely limited availability) concept. | D | E_B | Not implemented in Reference Implementation. |
| SR_ODA_CAP_280 | The ODA system shall be able to partially update a stitched mosaic - i.e. upload and replacement of a data subset (UpdateDataPart) or update a full data set (UpdateAll). | A | D_N | WCS-T not implemented in Reference Implementation. Additional standardization effort for WCS-T extension needed |
| SR_ODA_CAP_290 | The ODA system shall be able to update non-rectangular data subsets i.e. has to consider the CRS of the input and the target | A | D_N | WCS-T not implemented in Reference Implementation. Additional standardization effort for WCS-T extension needed |
| SR_ODA_CAP_300 | For the update of stitched mosaics the ODA system shall be able to keep track of the data history i.e. at any time the data source of each pixel shall be known (recoverable). | A | D_N | WCS-T not implemented in Reference Implementation. Additional standardization effort for WCS-T extension needed |

| | | | | |
|----------------|--|---|-----|---|
| SR_ODA_CAP_310 | <p>The ODA system shall maintain traceability.</p> <p>Note: Provide capability to identify all the data used for building any single or any stitched mosaic product. This information shall be part of the metadata delivered with the coverage.</p> | A | D_N | <p>WCS-T not implemented in Reference Implementation.</p> <p>Additional standardization effort for WCS-T extension needed</p> |
| SR_ODA_CAP_320 | <p>The ODA system shall provide TBD information to ensure the identification of a dataset (or a sub-dataset) and all the processes applied to it. This information shall be provided with the datasets metadata.</p> <p>Note: The End User accesses a dataset and wants to know who is the owner of the product, the date and the quality. This information shall be part of the metadata delivered with the coverage.</p> | A | D_N | <p>Metadata generation is not the focus of the ODA system development. The ODA system will provide the metadata as provided by the data provider and as foreseen in the respective OGC standard</p> |

| | | | | |
|----------------|--|---|-----|---|
| SR_ODA_CAP_330 | <p>A delivered stitched mosaic (or any subset thereof) shall provide, for every location in the delivered dataset, at least, the unique product identifier element (i.e. <eop:identifier>) of the original dataset used at this location.</p> <p>Note: This shall enable the user to look up the full metadata record in a catalog for each location of the delivered dataset. The shall be enabled to understand from which resources the stitched mosaic has been made of. This information shall be part of the metadata delivered with the coverage.</p> | A | D_N | <p>The ODA system will provide metadata as provided by the data provider and as foreseen in the respective OGC standard</p> |
| SR_ODA_CAP_331 | <p>A delivered stitched mosaic (or any subset thereof) should provide the acquisition time of the original datasets for every location in the delivered dataset.</p> <p>Note: This should enable the user investigate the delivered dataset, regarding any possible time constraints (actuality of the data) he might have, without the need to contact a catalog.</p> | A | D_N | <p>The ODA system will provide metadata as provided by the data provider and as foreseen in the respective OGC standard</p> |

| SR_ODA_CAP_360 | ODA shall allow transforming; mainly for re-projection purpose taken into account original data information. Note: This capability would allow to use radiometric sampling algorithms that minimize the re-projection effect on the information feature. | D | D_N | Such functionality is beyond the aim of the ODA system. Data transformation based on original data information would require a WCPS or WPS. |
|----------------|---|---------|------|---|
| SR_ODA_CAP_370 | ODA should allow the processing of the data. Note: The data is accessible on line with the minimum (TBD) metadata description that allows understanding the raster part of the data and all the parameters required for further processing as histogram stretching, classification, geometric enhancement. Such processing could also include the extraction of e.g. value added information to be used e.g. as filter for further data extraction. Note: this functionality requires a WCPS or WPS | A | D_N | Such functionality is beyond the aim of the ODA system. Such functionality requires a WCPS or WPS. |
| Performance | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_PE_040 | Since the total response time of a GetCoverage strongly depends on the size of the requested coverage; therefore a total response time can not be provided. | A | -- | -- |

| SR_ODA_GEN_120 | ODA shall allow Near Real Time visualization. Access to the data for visualization shall be with a minimum delay (no delay greater than TBD second for reload). | A | D_N | Since the ODA system is based on the access to full datasets (and not to portrayals, like WMS) access time strongly depends on the size of the dataset requested. |
|--|---|---------|------|---|
| Interface requirements | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_IF_020 | The ODA system should support the access via XML plus SOAP binding . | A | E_N | SOAP communication is not implemented in the Reference Implementation. Extension at a later stage possible. |
| SR_ODA_IF-CLI_050 | The WCS client should support WCS 2.0 Core with the SOAP 1.2 Binding. | D | D_N | Not demonstrable as not implemented by the available services. |
| SR_ODA_IF-CLI_070 | The WCS client should support GML Rectified Grids as model/format in combination with the WCS 2.0 Core. | D | D_N | Not demonstrable as not implemented by the available services. Only feasible for very small datasets |
| Design requirements and implementation constraints | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_DRC_020 | Standards and Recommendations developed in the frame of the HMA project shall be applied on request (where applicable). | D | E_Y | Currently only HMA Security Access Control has been requested, which will be made available at a later stage. |

| SR_ODA_DRC_030 | In case JPEG-2000 datasets have to be created utilizing proprietary transformation formats or libraries (e.g. ECW, MrSID, Kakadu) the license has to be provided as Customer Furnished Item. | A | D_N | currently not applicable |
|------------------------------------|--|------------|------|---|
| SR_ODA_DRC_040 | Computer and storage Hardware for the Reference Implementation has to be provided as Customer Furnished Item. | A | E_Y | TBC |
| Security and privacy requirements | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_SER_010 (SR_ODA_GEN_040) | The ODA System shall respect security and access control mechanisms based on | A | D_N | SR_ODA_GEN_040 |
| SR_ODA_SER_020 | The ODA System shall respect security and access control mechanisms for transactions . | A | D_N | WCS-T not implemented in Reference Implementation. Additional standardization effort for WCS-T extension needed |
| SR_ODA_SER_030 | ODA shall maintain security on the dataset level. Note: Data shall be protected by copyright and security processes that block illegal use or downloading. | A | D_N | Restricting the access for GetCoverage request would also block the use of the ODA system as a viewing service. |
| Software quality requirements | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_QR_030 | The software development shall follow ECSS standards | A | E_Y | Documented in delivered Documents. |
| Software safety requirements | | | | |

| Identifier | Description | Val .M. | Sig. | Comment |
|---------------------------------------|---|------------|------|---|
| SR_ODA_SFR_010 | Access to the ODA Hardware shall be limited. | D | D_B | Activation of Basic Authentication access control instantiated by the WebServer is possible |
| Test Platform Validation Requirements | | | | |
| Identifier | Description | Val .M. | Sig. | Comment |
| SR_ODA_VA_100 | The ODA system will be provided with an ATPi document . | D | E_Y | ATPI is represented by this document DJF-SVS |
| SR_ODA_VA_110 | The ATPi shall allow to test the functionality to access offered datasets | D | E_Y | DJF-SVS (this document) provides ample Test Cases and Test Procedures to validate the access to offered datasets. |

10 Validation test platform requirements

10.1 ODA system Server

Hardware resources:

- CPU: low-end server machine, x86 based PC
- RAM: 4 to 8 GB
- Graphic Adapter: no specific needs
- Disks: RAID-10 Array with a "hot spare" (size depending on test data set storage location - TBD)

Software resources:

- Operating System: Linux, preferentially Debian lenny/squeeze/sid (or Ubuntu)
- Apache HTTP server $\geq 2.2.0$
- MapServer 5.6.5
- PostgreSQL ≥ 8.1 & PostGIS extension $\geq 1.3.0$
- Django Framework ≥ 1.2 (also including GeoDjango)
- GDAL/OGR ≥ 1.4
- Python 2.6
- mod_wsgi 3.3
- various libraries like libxml2, libtiff, libgeotiff, etc.

10.2 WCS client Software

We recommend the following minimal hardware configuration for running the WCS client

- CPU: 3.7 GhZ dual Core
- RAM: 4 GB
- Disk Size 70GB RAID

The following auxiliary software should be installed on the machine before deploying the WCS client war file

- OS: Windows, Solaris or Linux (CentOS or Debian or equivalent – both 32 & 64 bits versions supported)
- Servlet container (e.g. Tomcat 6)
- JDK 6
- JAI: JAI version 1.1.3 and JAI imageIO 1.1.0
- RDBMS like Oracle or PostgreSQL/PostGIS for storing the map configurations
- GDAL Version 1.4.0

11 Software validation specification additional information

11.1 Requirements vs. Test cases traceability matrix

All requirements and features not reported in [AD14] or not showing one of the tags E_Y, E_B, D_Y, D_B, are out of the scope of this document.

| WCS server requirements | | | | |
|-------------------------|--|--------|------|--------------|
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_GEN_010 | The Online Data Access System (ODA) shall be accessible over the network. | D | E_Y | TC_001_001 |
| SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y | TC_010_010 |
| SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y | TC_010_020 |
| SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y | TC_010_030 |
| SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y | TC_010_040 |
| SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y | TC_010_010 |

| | | | | |
|----------------|---|---|-----|------------|
| SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y | TC_010_020 |
| SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y | TC_010_030 |
| SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y | TC_010_040 |
| SR_ODA_GEN_070 | The ODA system shall be able to be configured to work in a stand-alone mode. Note: Stand-alone mode, in this respect, means it should be configurable to work in a restricted environment with a limited access to data resources. | D | E_Y | TC_001_001 |
| SR_ODA_GEN_130 | ODA shall provide access to the data content with at least one set of metadata. Note: The amount and the content of metadata provided for a Dataset depends on the type of Dataset. | D | D_Y | TC_010_040 |

| | | | | |
|----------------|--|---|-----|------------|
| SR_ODA_GEN_140 | The ODA system shall provide at least one interface to be integrated with an End User environment. Note: The data is accessible directly out of End User's application (e.g. a GIS system) using either Web Service, API, or Add-on depending on the respective client. | D | D_Y | TC_010_040 |
| SR_ODA_CAP_010 | The ODA system shall allow the download of full datasets. | D | E_Y | TC_010_040 |
| SR_ODA_CAP_020 | The ODA system shall allow the selection of AOIs (sub-datasets). | D | E_Y | TC_010_040 |
| SR_ODA_CAP_030 | The ODA system shall allow the download of sub-datasets (i.e. trim functionality - extract data from files and mosaics). | D | E_Y | TC_010_040 |
| SR_ODA_CAP_040 | The ODA system shall allow the selection of time-slots. | D | E_Y | TC_010_030 |
| SR_ODA_CAP_041 | The ODA system shall allow the download of selected time-slots. | D | E_B | TC_010_040 |
| SR_ODA_CAP_050 | The ODA system shall allow the selection of time series. Note: sub-setting within a time range e.g files between a start and an end date set by the use | D | E_Y | TC_010_030 |
| SR_ODA_CAP_051 | The ODA system shall allow the download of time series. | D | E_B | TC_010_040 |
| SR_ODA_CAP_070 | The ODA system shall allow to download the datasets in different projections and datums. | D | E_Y | TC_010_040 |
| SR_ODA_CAP_080 | The ODA system shall allow to download the datasets in various file formats. Note: In particular one of GeoTIFF, netCDF, or JPEG2000 shall be supported at least. | D | E_B | TC_010_040 |

| | | | | |
|----------------|--|---|-----|------------|
| SR_ODA_CAP_090 | The ODA system shall allow the download of different channels (bands) of a dataset (e.g. cloud coverage, and other masks) | D | E_B | TC_010_040 |
| SR_ODA_CAP_100 | When used as a view service the ODA system shall allow the access of different channels of a dataset (e.g. bitmasks). | D | E_B | |
| SR_ODA_CAP_110 | The ODA system shall be able to access Grid coverages (more precisely, quadrilateral grid coverages). | D | E_Y | TC_010_040 |
| SR_ODA_CAP_140 | The ODA system shall allow access to the data in its original coordinate reference system. | D | E_Y | TC_010_040 |
| SR_ODA_CAP_150 | The ODA system shall support the use of CRS defined by official EPSG codes (version TBD) (for transformations during the download of datasets). | D | E_Y | TC_010_040 |
| SR_ODA_CAP_160 | Downloading shall allow transfer with CRS transformation. The product downloaded is transformed into another CRS than that of the source. The product is transformed "on the fly". | D | E_Y | TC_010_040 |
| SR_ODA_CAP_190 | The ODA system shall be able to be reconfigured (e.g. based on DB input) to enable the instantiation of the "rolling archive" (flowing dataset e.g. FIFO) concept. | D | E_B | TC_020_050 |
| SR_ODA_CAP_210 | The system shall be designed to be able to hold multi-layer raster datasets, e.g. multispectral EO ortho-imagery, error layers, bitmasks. | D | E_B | TC_020_030 |

| | | | | |
|-------------------------|---|---|-----|------------|
| SR_ODA_CAP_230 | The ODA system shall handle data at various processing levels as defined by CEOS. | D | E_B | TC_020_030 |
| SR_ODA_CAP_250 | The ODA system shall not break the general usage e.g. GetCoverage of the implemented solution. Note: Result shall be viewable in a client e.g. Browsers | D | E_Y | TC_010_040 |
| SR_ODA_CAP_260 | It shall be possible for an ODA system to reuse available EO metadata (e.g. from a catalog). | D | E_B | TC_020_020 |
| SR_ODA_CAP_270 | The ODA system shall be able to add a new datasets (file/mosaic) to a repository. | D | E_Y | TC_020_030 |
| SR_ODA_CAP_270 | The ODA system shall be able to add a new datasets (file/mosaic) to a repository. | D | E_Y | TC_020_050 |
| SR_ODA_CAP_380 | Downloading shall allow the transfer of an extraction or of the complete dataset with a minimum set (TBD) of metadata. Note: The End User discovers and visualizes the product. The End User wants either a complete download of the product or only an extract for final publishing off line. This final publishing should be a paper map or a backdrop display on a device (PDA/Mobile...). The minimum metadata required shall provide copyright, acquisition date and CRS. | D | D_Y | TC_010_040 |
| SR_ODA_CAP_390 | The ODA system shall allow the download of the data in its original unmodified data type. | D | D_Y | TC_010_040 |
| SR_ODA_CAP_400 | The ODA system shall support dataset collections. | D | E_Y | TC_010_030 |
| WCS client requirements | | | | |

| Identifier | Description | Val.M. | Sig. | Test Case ID |
|------------------------|--|--------|------|--|
| SR_ODA_CAP- CLI_010 | The WCS client shall be able to visualize datasets that are offered via Web Coverage Services. | D | E_Y | TC_030_010 TC_030_020 TC_030_030 |
| SR_ODA_CAP- CLI_020 | Coverage Datasets shall be shown in the clients layer manager. Note: The following general layer management functions shall be available for datasets: - Hide/Show dataset layers - Change transparency - Re-order layers - Zoom to extent of layers | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_030 | The layer manager shall contain a button that allows the visualization of the dataset metadata that is offered via the DescribeCoverage operation. Both presentation in HTML and downloading in XML/GML shall be provided. | D | D_Y | Not implemented yet |
| SR_ODA_CAP- CLI_040 | The dataset layer shall be visualized on the WCS client's map whereby the WCS client will request the image with the appropriate extent and resolution from the WCS. Note: In other words, the WCS client will only download the part of the image that is required for presentation of the result. | D | E_Y | TC_030_010 TC_030_020 TC_030_030 |
| SR_ODA_CAP- CLI_050 | The WCS client shall offer a "Coverage Parameters" form where the user can specify several options with respect to the visualization of the datasets. | D | E_Y | TC_030_020 |

| | | | | |
|------------------------|--|---|-----|------------|
| SR_ODA_CAP- CLI_060 | In addition, the "Coverage Symbology" form shall allow the user to specify the bands which shall be mapped to Red, Green and Blue values if the dataset is to be presented in (true or false) color. | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_070 | The "Coverage Symbology" form shall allow the user to specify the dataset band to be used if the image is to be presented in gray scales. | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_080 | The "Coverage Symbology" form shall allow the user to specify the (background) color that shall be made transparent. | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_090 | The "Coverage Symbology" form shall allow the user to specify simple "image enhancements" (histogram stretches). | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_100 | The "Coverage Parameters" form shall allow the user to specify the time of interest in case the offered Dataset is available at multiple times. | D | E_N | TC_030_020 |

| | | | | |
|------------------------|--|---|-----|------------|
| SR_ODA_CAP- CLI_110 | <p>The "Coverage Download" form shall allow the user to download the dataset, by specifying:</p> <ul style="list-style-type: none"> - the extent of the dataset to be downloaded via choosing either the full dataset extent, via specifying an AOI on the map or alternatively by the specification of the current map view - the output format (from the list of formats that the dataset supports) - the resolution in X and Y direction (default values presented in non-exponential notation and given in the native CRS) or the width and height expressed in pixels - the output CRS (default value being the native CRS) - the interpolation method - the time of interest | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_120 | <p>The user shall be offered the possibility to add dataset layers to the WCS client by using the add layer functionality of the layer manager.</p> <p>Note: A form shall be presented to the user where he needs to provide the base URL of the Service, set the Service Type to WCS, select the appropriate WCS Version and select the appropriate WCS profile or extension.</p> | D | E_Y | TC_030_020 |
| SR_ODA_CAP- CLI_130 | <p>If the WCS Service exposes individual datasets in its capabilities, the WCS client shall list these to the user, to allow the selection of one or more datasets which shall be added to the map.</p> | D | E_Y | TC_030_010 |

| | | | | |
|------------------------|--|---|-----|------------|
| SR_ODA_CAP- CLI_140 | If the WCS Service exposes dataset series, the client application will allow to define an AOI and specify the range. Subsequently a list of matching datasets will be shown. | D | E_Y | TC_030_030 |
| SR_ODA_CAP- CLI_150 | The Service provider shall be offered the same WCS Symbology functionality as the end user when setting up a WCS client configuration. | D | D_Y | TC_030_020 |
| SR_ODA_CAP- CLI_160 | The Service provider shall be equipped with a JavaScript API that allows the service provider to configure a Web Portal Service instance in order to add dataset at run by passing a Web Map Context Document that contains the references to the coverage(s)) . To be used for instance from within a CIM (services or data) or EO EP of ebRIM CSW catalog. | T | D_Y | TC_030_020 |
| SR_ODA_CAP- CLI_170 | The Service provider shall be equipped with a mechanism that allows the service provider to configure a Web Portal Service installation to add datasets upon start-up of the WCS client viewer. Note: To be used for instance to allow display of datasets that are the result of Web Coverage Processing Services. | T | D_Y | TC_030_020 |
| Performance | | | | |

| Identifier | Description | Val.M. | Sig. | Test Case ID |
|------------------------|---|--------|------|--------------|
| SR_ODA_PE_010 | The total response time of a GetCapabilities request shall not exceed 5 seconds. | T | D_Y | TC_010_010 |
| SR_ODA_PE_020 | The total response time of a DescribeCoverage request shall not exceed 5 seconds. | T | D_Y | TC_010_020 |
| SR_ODA_PE_030 | Since the total response time of a DescribeEOCoverageSet request strongly depends on the size of the targeted Dataset Series a total response time can not be provided. However, it is recommended that the response time should not exceed 20 seconds. | T | D_Y | TC_010_030 |
| Interface requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y | TC_010_010 |
| SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y | TC_010_020 |
| SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y | TC_010_030 |
| SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y | TC_010_040 |
| SR_ODA_IF_050 | The ODA system shall support the following output formats: GeoTIFF according to the OGC WCS 2.0 file format extensions | D | E_Y | TC_010_040 |
| SR_ODA_IF_060 | The ODA system shall support the following output formats: GML/Multipart MIME | D | E_Y | TC_010_040 |

| SR_ODA_IF_070 | The ODA system shall allow to access Archive Servers using the following protocols: FTP HTTP WCS | D | E_B | TC_010_040 |
|------------------------------------|---|--------|------|--------------|
| SR_ODA_IF_080 (SR_ODA_GEN_050) | see SR_ODA_GEN_050 in section 5.2.1 The ODA system shall support the requests defined in WCS EO AP . | D | E_B | TC_010_030 |
| SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y | TC_010_010 |
| SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y | TC_010_020 |
| SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y | TC_010_030 |
| SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y | TC_010_040 |
| Human-Machine-Interface (HMI) | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_IF- CLI_030 | The WCS client shall support WCS 1.0.0 with the HTTP Get Binding. | D | D_Y | |
| SR_ODA_IF- CLI_040 | The WCS client should support WCS 2.0 Core with the HTTP Get Binding. | D | E_Y | TC_030_010 |
| SR_ODA_IF- CLI_060 | The WCS client shall support the following image formats: - GeoTIFF (as per the limitations of SUN JAI libraries in handling TIFFs) - Other coverage formats as supported by the Open Source GDAL library - GDAL forms an optional component of the WCS client installation. | D | E_Y | TC_030_010 |
| | | | | |

| SR_ODA_IF- CLI_080 | The WCS client should support the WCS EO Application Profile Note: Extent of support to be confirmed after definition of extension if all aspects of this EO Extension can be covered. | D | D_B | TC_030_030 |
|--------------------------|---|--------|------|--------------|
| Operational requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y | TC_010_010 |
| SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y | TC_010_020 |
| SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y | TC_010_030 |
| SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y | TC_010_040 |
| SR_ODA_SOR_080 | The ODA system shall provide the operator with an interface allowing checking of logs of received requests | D | D_B | TC_020_010 |
| SR_ODA_SOR_090 | The configuration data needed for the ODA system shall be kept within text files. | D | D_Y | TC_001_001 |
| SR_ODA_SOR_100 | The ODA system shall provide the operator with an interface allowing the configuration and update of the ODA system | D | D_Y | TC_020_040 |
| SR_ODA_SOR_100 | The ODA system shall provide the operator with an interface allowing the configuration and update of the ODA system | D | D_Y | TC_020_050 |
| SR_ODA_SOR_110 | The ODA system shall provide the operator with an interface allowing the upload and ingestion of datasets | D | D_B | TC_020_030 |

| SR_ODA_SOR_150 | The ODA system shall provide the operator with an interface allowing DB Management | D | D_B | TC_020_020 |
|---------------------------------|---|--------|------|--------------|
| Resources requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_SOR_010 | The ODA system should be made available utilizing an instantiation of Debian based Linux (possibly Linux-HA - TBC) (version TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SOR_020 | The PostgreSQL DB with the PostGIS extension shall be available (version TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SOR_030 | The GDAL library shall be available (version TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SOR_040 | Python programming language shall be available (version TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SOR_050 | GCC compiler and Linux header files shall be available (version TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SOR_060 | A series of EPSG codes to be supported, and which GDAL must be able to handle, shall be agreed upon. | D | E_Y | TC_001_001 |
| SR_ODA_SOR_120 | The ODA system shall run on a low end server machine, x86 based PC | D | D_Y | TC_001_001 |
| SR_ODA_SOR_130 | The ODA system shall run on a PC with at least 4GB RAM (preferentially 8GB) | D | D_Y | TC_001_001 |
| SR_ODA_SOR_140 (ODA_CRR_010) | The ODA system shall run on a PC with a RAID-10 Disk Array with a "hot spare" (size is dependent on data holding for the demonstration - TBD) | D | D_B | TC_001_001 |
| SR_ODA_SSOR_010 | The platform where the ODA System is installed shall be connected to the Internet. | D | E_Y | TC_001_001 |

| SR_ODA_SSOR_020 | The platform where the ODA System is installed shall be secured with a firewall (TBC). | D | E_B | TC_001_001 |
|--|---|--------|------|-------------------------------------|
| SR_ODA_SSOR_040 | The platform where the ODA System is installed should operate an intrusion-detection software (TBC). | D | E_B | TC_001_001 |
| SR_ODA_SSOR_050 | The platform where the ODA System is installed should operate a system-wide logging system (TBD). | D | E_Y | TC_001_001 |
| SR_ODA_SSOR_060 | The platform where the ODA System is installed should operate a logging analyzes tool (TBD). | D | E_Y | TC_001_001 |
| Design requirements and implementation constraints | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y | TC_010_010 |
| SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y | TC_010_020 |
| SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y | TC_010_030 |
| SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y | TC_010_040 |
| SR_ODA_DRC_050 | A WebMapView client software shall be used as WCS client for the demonstration setup. | D | E_Y | TC030_010 TC030_020 TC030_030 |
| SR_ODA_DRC_060 | The protocols used for ODA should not require additional ports to be opened. | D | E_Y | TC_001_001 |
| SR_ODA_DRC_070 | The enhancements needed for the implementation of the Reference Implementation shall be based on OpenSource software tools. | D | E_Y | TC_001_001 |

| SR_ODA_DRC_080 (ODA_GEN_060) | The Reference Implementation shall be based on OpenSource software tools | D | E_Y | TC_001_001 |
|-----------------------------------|--|--------|------|--------------|
| Security and privacy requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_SER_040 | The data accessible online shall be protected for illegal downloading. Note: The End User shall have accesses to the data for discovery and visualization purpose. When he wants to process or download the data, the platform shall identify the user and check his rights as defined on SLA. | D | E_B | TC_010_040 |
| SR_ODA_SER_050 | The security constraint shall not be a barrier to the commercial activity. Note: The End User accesses the data online and the security is applied only when necessary with a non significant impact of ease access to the data for authorized users. | D | E_B | TC_010_040 |
| SR_ODA_SER_060 | The security level shall be in line with the threat. Note: The End User accesses free online data (free sub sampling data of commercial product), no security applied for normal use. Nevertheless, in case of massive request that demonstrate no real user connected, the platform should apply a minimum security process as authoritarian disconnection and blacklisted user action. | D | E_B | TC_010_040 |
| Software quality requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |

| SR_ODA_QR_010 | The ODA system shall be developed to operate under a Linux Operating System | D | E_Y | TC_001_001 |
|---|--|--------|------|--------------|
| Software maintainability requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_SMR_010 | The developers and maintainers require a user account on the installation platform. | D | E_Y | TC_001_001 |
| SR_ODA_SMR_020 | The system shall provide access via a SSH connection for the developers and maintainers. | D | E_Y | TC_001_001 |
| SR_ODA_SMR_030 | Root access or superuser (sudo) access rights will be required for the developers and maintainers (at least during initial setup and operations). | D | E_Y | TC_001_001 |
| Data definition and database requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_DDD_010 (ODA_SOR_020) | PostgreSQL with the PostGIS extension shall be used for the Reference Implementation | D | E_Y | TC_001_001 |
| Test Platform Validation Requirements | | | | |
| Identifier | Description | Val.M. | Sig. | Test Case ID |
| SR_ODA_VA_120 | The ATPI shall include tests against the following product collections (TBC): SPOT GeoTIFF (DIMAP) Envisat ASAR Level 1 and above products Note: In general all product formats supported by GDAL are potentially possible (but some might need extra integration effort) | D | E_Y | TC_020_030 |

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|---------------|--|---|-----|------------|
| SR_ODA_VA_130 | A test platform as defined by the requirements SR_ODA_SOR_120 and SR_ODA_SOR_130 in section 5.6 should be used | A | E_Y | TC_001_001 |
|---------------|--|---|-----|------------|

11.2 Test cases vs. Requirements traceability matrix

| Test Case ID | Identifier | Description | Val. M. | Sig. |
|--------------|---------------------------------|---|---------|------|
| TC_001_001 | SR_ODA_DDD_010 (ODA_SOR_020) | PostgreSQL with the PostGIS extension shall be used for the Reference Implementation | D | E_Y |
| TC_001_001 | SR_ODA_DRC_060 | The protocols used for ODA should not require additional ports to be opened. | D | E_Y |
| TC_001_001 | SR_ODA_DRC_070 | The enhancements needed for the implementation of the Reference Implementation shall be based on OpenSource software tools. | D | E_Y |
| TC_001_001 | SR_ODA_DRC_080 (ODA_GEN_060) | The Reference Implementation shall be based on OpenSource software tools | D | E_Y |
| TC_001_001 | SR_ODA_GEN_010 | The Online Data Access System (ODA) shall be accessible over the network. | D | E_Y |
| TC_001_001 | SR_ODA_GEN_070 | The ODA system shall be able to be configured to work in a stand-alone mode. Note: Stand-alone mode, in this respect, means it should be configurable to work in a restricted environment with a limited access to data resources. | D | E_Y |

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| TC_001_001 | SR_ODA_QR_010 | The ODA system shall be developed to operate under a Linux Operating System | D | E_Y |
| TC_001_001 | SR_ODA_SMR_010 | The developers and maintainers require a user account on the installation platform. | D | E_Y |
| TC_001_001 | SR_ODA_SMR_020 | The system shall provide access via a SSH connection for the developers and maintainers. | D | E_Y |
| TC_001_001 | SR_ODA_SMR_030 | Root access or superuser (sudo) access rights will be required for the developers and maintainers (at least during initial setup and operations). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_010 | The ODA system should be made available utilizing an instantiation of Debian based Linux (possibly Linux-HA - TBC) (version TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_020 | The PostgreSQL DB with the PostGIS extension shall be available (version TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_030 | The GDAL library shall be available (version TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_040 | Python programming language shall be available (version TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_050 | GCC compiler and Linux header files shall be available (version TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SOR_060 | A series of EPSG codes to be supported, and which GDAL must be able to handle, shall be agreed upon. | D | E_Y |
| TC_001_001 | SR_ODA_SOR_090 | The configuration data needed for the ODA system shall be kept within text files. | D | D_Y |
| TC_001_001 | SR_ODA_SOR_120 | The ODA system shall run on a low end server machine, x86 based PC | D | D_Y |
| TC_001_001 | SR_ODA_SOR_130 | The ODA system shall run on a PC with at least 4GB RAM (preferentially 8GB) | D | D_Y |

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|------------|---------------------------------|--|---|-----|
| TC_001_001 | SR_ODA_SOR_140 (ODA_CRR_010) | The ODA system shall run on a PC with a RAID-10 Disk Array with a "hot spare" (size is dependent on data holding for the demonstration - TBD) | D | D_B |
| TC_001_001 | SR_ODA_SSOR_01 0 | The platform where the ODA System is installed shall be connected to the Internet. | D | E_Y |
| TC_001_001 | SR_ODA_SSOR_02 0 | The platform where the ODA System is installed shall be secured with a firewall (TBC). | D | E_B |
| TC_001_001 | SR_ODA_SSOR_04 0 | The platform where the ODA System is installed should operate an intrusion-detection software (TBC). | D | E_B |
| TC_001_001 | SR_ODA_SSOR_05 0 | The platform where the ODA System is installed should operate a system-wide logging system (TBD). | D | E_Y |
| TC_001_001 | SR_ODA_SSOR_06 0 | The platform where the ODA System is installed should operate a logging analyzes tool (TBD). | D | E_Y |
| TC_001_001 | SR_ODA_VA_130 | A test platform as defined by the requirements SR_ODA_SOR_120 and SR_ODA_SOR_130 in section 5.6 should be used | A | E_Y |
| TC_010_010 | SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y |
| TC_010_010 | SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y |
| TC_010_010 | SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y |
| TC_010_010 | SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y |
| TC_010_010 | SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y |

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| TC_010_010 | SR_ODA_PE_010 | The total response time of a GetCapabilities request shall not exceed 5 seconds. | T | D_Y |
| TC_010_010 | SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y |
| TC_010_020 | SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y |
| TC_010_020 | SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y |
| TC_010_020 | SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y |
| TC_010_020 | SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y |
| TC_010_020 | SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y |
| TC_010_020 | SR_ODA_PE_020 | The total response time of a DescribeCoverage request shall not exceed 5 seconds. | T | D_Y |
| TC_010_020 | SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y |
| TC_010_030 | SR_ODA_CAP_040 | The ODA system shall allow the selection of time-slots. | D | E_Y |
| TC_010_030 | SR_ODA_CAP_050 | The ODA system shall allow the selection of time series. Note: sub-setting within a time range e.g files between a start and an end date set by the use | D | E_Y |
| TC_010_030 | SR_ODA_CAP_400 | The ODA system shall support dataset collections. | D | E_Y |
| TC_010_030 | SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y |

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|------------|-----------------------------------|---|---|-----|
| TC_010_030 | SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y |
| TC_010_030 | SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y |
| TC_010_030 | SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y |
| TC_010_030 | SR_ODA_IF_080 (SR_ODA_GEN_050) | see SR_ODA_GEN_050 in section 5.2.1 The ODA system shall support the requests defined in WCS EO AP . | D | E_B |
| TC_010_030 | SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y |
| TC_010_030 | SR_ODA_PE_030 | Since the total response time of a DescribeEOCoverageSet request strongly depends on the size of the targeted Dataset Series a total response time can not be provided. However, it is recommended that the response time should not exceed 20 seconds. | T | D_Y |
| TC_010_030 | SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y |
| TC_010_040 | SR_ODA_CAP_010 | The ODA system shall allow the download of full datasets. | D | E_Y |
| TC_010_040 | SR_ODA_CAP_020 | The ODA system shall allow the selection of AOIs (sub-datasets). | D | E_Y |
| TC_010_040 | SR_ODA_CAP_030 | The ODA system shall allow the download of sub-datasets (i.e. trim functionality - extract data from files and mosaics). | D | E_Y |
| TC_010_040 | SR_ODA_CAP_041 | The ODA system shall allow the download of selected time-slots. | D | E_B |
| TC_010_040 | SR_ODA_CAP_051 | The ODA system shall allow the download of time series. | D | E_B |

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| TC_010_040 | SR_ODA_CAP_070 | The ODA system shall allow to download the datasets in different projections and datums. | D | E_Y |
| TC_010_040 | SR_ODA_CAP_080 | The ODA system shall allow to download the datasets in various file formats. Note: In particular one of GeoTIFF, netCDF, or JPEG2000 shall be supported at least. | D | E_B |
| TC_010_040 | SR_ODA_CAP_090 | The ODA system shall allow the download of different channels (bands) of a dataset (e.g. cloud coverage, and other masks) | D | E_B |
| TC_010_040 | SR_ODA_CAP_110 | The ODA system shall be able to access Grid coverages (more precisely, quadrilateral grid coverages). | D | E_Y |
| TC_010_040 | SR_ODA_CAP_140 | The ODA system shall allow access to the data in its original coordinate reference system. | D | E_Y |
| TC_010_040 | SR_ODA_CAP_150 | The ODA system shall support the use of CRS defined by official EPSG codes (version TBD) (for transformations during the download of datasets). | D | E_Y |
| TC_010_040 | SR_ODA_CAP_160 | Downloading shall allow transfer with CRS transformation. The product downloaded is transformed into another CRS than that of the source. The product is transformed "on the fly". | D | E_Y |
| TC_010_040 | SR_ODA_CAP_250 | The ODA system shall not break the general usage e.g. GetCoverage of the implemented solution. Note: Result shall be viewable in a client e.g. Browsers | D | E_Y |

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| TC_010_040 | SR_ODA_CAP_380 | Downloading shall allow the transfer of an extraction or of the complete dataset with a minimum set (TBD) of metadata. Note: The End User discovers and visualizes the product. The End User wants either a complete download of the product or only an extract for final publishing off line. This final publishing should be a paper map or a backdrop display on a device (PDA/Mobile...). The minimum metadata required shall provide copyright, acquisition date and CRS. | D | D_Y |
| TC_010_040 | SR_ODA_CAP_390 | The ODA system shall allow the download of the data in its original unmodified data type. | D | D_Y |
| TC_010_040 | SR_ODA_DRC_010 | OGC standards shall be applied where applicable. | D | E_Y |
| TC_010_040 | SR_ODA_GEN_011 | The ODA system shall be implemented using standardized interfaces. | D | E_Y |
| TC_010_040 | SR_ODA_GEN_050 | The ODA system shall respect the WCS EO AP as far as currently defined. Note: The definition of the WCS EO AP is part of this project and is currently under revision by OGC's WCS.SWG. | D | E_Y |
| TC_010_040 | SR_ODA_GEN_130 | ODA shall provide access to the data content with at least one set of metadata. Note: The amount and the content of metadata provided for a Dataset depends on the type of Dataset. | D | D_Y |
| TC_010_040 | SR_ODA_GEN_140 | The ODA system shall provide at least one interface to be integrated with an End User environment. Note: The data is accessible directly out of End User's application (e.g. a GIS system) using either Web Service, API, or Add-on depending on the respective client. | D | D_Y |
| TC_010_040 | SR_ODA_IF_010 | The ODA system shall support the access via HTTP KVP . | D | E_Y |

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| TC_010_040 | SR_ODA_IF_050 | The ODA system shall support the following output formats: GeoTIFF according to the OGC WCS 2.0 file format extensions | D | E_Y |
| TC_010_040 | SR_ODA_IF_060 | The ODA system shall support the following output formats: GML/Multipart MIME | D | E_Y |
| TC_010_040 | SR_ODA_IF_070 | The ODA system shall allow to access Archive Servers using the following protocols: FTP HTTP WCS | D | E_B |
| TC_010_040 | SR_ODA_IF_090 (ODA_DEM_030) | The ODA system shall support the requests defined in WCS 2.0 | D | E_Y |
| TC_010_040 | SR_ODA_SER_040 | The data accessible online shall be protected for illegal downloading. Note: The End User shall have accesses to the data for discovery and visualization purpose. When he wants to process or download the data, the platform shall identify the user and check his rights as defined on SLA. | D | E_B |
| TC_010_040 | SR_ODA_SER_050 | The security constraint shall not be a barrier to the commercial activity. Note: The End User accesses the data online and the security is applied only when necessary with a non significant impact of ease access to the data for authorized users. | D | E_B |

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| TC_010_040 | SR_ODA_SER_060 | The security level shall be in line with the threat. Note: The End User accesses free online data (free sub sampling data of commercial product), no security applied for normal use. Nevertheless, in case of massive request that demonstrate no real user connected, the platform should apply a minimum security process as authoritarian disconnection and blacklisted user action. | D | E_B |
| TC_010_040 | SR_ODA_SOR_070 | The ODA system shall log received request and provided responses. | D | E_Y |
| TC_020_010 | SR_ODA_SOR_080 | The ODA system shall provide the operator with an interface allowing checking of logs of received requests | D | D_B |
| TC_020_020 | SR_ODA_CAP_260 | It shall be possible for an ODA system to reuse available EO metadata (e.g. from a catalog). | D | E_B |
| TC_020_020 | SR_ODA_SOR_150 | The ODA system shall provide the operator with an interface allowing DB Management | D | D_B |
| TC_020_030 | SR_ODA_CAP_210 | The system shall be designed to be able to hold multi-layer raster datasets, e.g. multispectral EO ortho-imagery, error layers, bitmasks. | D | E_B |
| TC_020_030 | SR_ODA_CAP_230 | The ODA system shall handle data at various processing levels as defined by CEOS. | D | E_B |
| TC_020_030 | SR_ODA_CAP_270 | The ODA system shall be able to add a new datasets (file/mosaic) to a repository. | D | E_Y |
| TC_020_030 | SR_ODA_SOR_110 | The ODA system shall provide the operator with an interface allowing the upload and ingestion of datasets | D | D_B |

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|------------|------------------------|--|---|-----|
| TC_020_030 | SR_ODA_VA_120 | The ATPI shall include tests against the following product collections (TBC): SPOT GeoTIFF (DIMAP) Envisat ASAR Level 1 and above products Note: In general all product formats supported by GDAL are potentially possible (but some might need extra integration effort) | D | E_Y |
| TC_020_040 | SR_ODA_SOR_100 | The ODA system shall provide the operator with an interface allowing the configuration and update of the ODA system | D | D_Y |
| TC_020_050 | SR_ODA_CAP_190 | The ODA system shall be able to be reconfigured (e.g. based on DB input) to enable the instantiation of the "rolling archive" (flowing dataset e.g. FIFO) concept. | D | E_B |
| TC_020_050 | SR_ODA_CAP_270 | The ODA system shall be able to add a new datasets (file/mosaic) to a repository. | D | E_Y |
| TC_020_050 | SR_ODA_SOR_100 | The ODA system shall provide the operator with an interface allowing the configuration and update of the ODA system | D | D_Y |
| | SR_ODA_CAP_100 | When used as a view service the ODA system shall allow the access of different channels of a dataset (e.g. bitmasks). | D | E_B |
| TC_030_010 | SR_ODA_CAP- CLI_010 | The WCS client shall be able to visualize datasets that are offered via Web Coverage Services. | D | E_Y |
| TC_030_010 | SR_ODA_CAP- CLI_130 | If the WCS Service exposes individual datasets in its capabilities, the WCS client shall list these to the user, to allow the selection of one or more datasets which shall be added to the map. | D | E_Y |

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| TC_030_010 | SR_ODA_CAP- CLI_040 | The dataset layer shall be visualized on the WCS client's map whereby the WCS client will request the image with the appropriate extent and resolution from the WCS. <i>Note: In other words, the WCS client will only download the part of the image that is required for presentation of the result.</i> | D | E_Y |
| TC_030_010 | SR_ODA_IF- CLI_040 | The WCS client should support WCS 2.0 Core with the HTTP Get Binding. | D | E_Y |
| TC03.010 | SR_ODA_IF- CLI_060 | The WCS client shall support the following image formats: <ul style="list-style-type: none"> • GeoTIFF (as per the limitations of SUN JAI libraries in handling TIFFs) • Other coverage formats as supported by the Open Source GDAL library including JPEG2000 (GMLJP2 and GeoJP2) | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_010 | The WCS client shall be able to visualize datasets that are offered via Web Coverage Services. | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_020 | Datasets shall be shown in the clients layer manager. <i>Note: The following general layer management functions shall be available for datasets:</i> <ul style="list-style-type: none"> • Hide/Show dataset layers • Change transparency • Re-order layers • Zoom to extent of layers | D | E_Y |
| Not implemented yet | SR_ODA_CAP- CLI_030 | The layer manager shall contain a button that allows the visualization of the dataset metadata that is offered via the <i>DescribeCoverage</i> operation. Both presentation in HTML and downloading in GML/XML shall be provided. | D | D_Y |

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| TC_030_020 | SR_ODA_CAP- CLI_050 | The WCS client shall offer a "Coverage Parameters" form where the user can specify several options with respect to the visualization of the datasets. | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_060 | In addition, the "Coverage Symbolology" form shall allow the user to specify the bands which shall be mapped to Red, Green and Blue values if the dataset is to be presented in (true or false) color. | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_070 | The "Coverage Symbolology" form shall allow the user to specify the dataset band to be used if the image is to be presented in gray scales. | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_080 | The "Coverage Symbolology " form shall allow the user to specify the (background) color that shall be made transparent. | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_090 | The "Coverage Symbolology " form shall allow the user to specify simple "image enhancements" (histogram stretches). | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_100 | The "Coverage Parameters" form shall allow the user to specify the time of interest in case the offered dataset allows this. | D | E_N |

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| TC_030_020 | SR_ODA_CAP- CLI_110 | <p>The "Coverage Download" form shall allow the user to download the dataset, by specifying:</p> <ul style="list-style-type: none"> the extent of the dataset to be downloaded via choosing either the full dataset extent, via specifying an AOI on the map or alternatively by the specification of the current map view the output format (from the list of formats that the dataset supports) the resolution in X and Y direction (default values presented in non-exponential notation and given in the native CRS) or the width and height expressed in pixels the output CRS (default value being the native CRS) the interpolation method the time of interest | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_120 | <p>The user shall be offered the possibility to add dataset layers to the WCS client by using the add layer functionality of the layer manager.</p> <p><i>Note: A form shall be presented to the user where he needs to provide the base URL of the Service, set the Service Type to WCS, select the appropriate WCS Version and select the appropriate WCS profile or extension.</i></p> | D | E_Y |
| TC_030_020 | SR_ODA_CAP- CLI_150 | <p>The Service provider shall be offered the same WCS symbology functionality as the end user when setting up a WCS client configuration.</p> | D | D_Y |

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| TC_030_020 | SR_ODA_CAP- CLI_160 | The Service provider shall be equipped with a JavaScript API that allows the service provider to configure a Web Portal Service instance in order to add WCS dataset(s) at run time by passing a Web Map Context Document that contains the references to the coverage(s)). To be used for instance from within a CIM (services or data) or EO EP of ebRIM CSW catalog . | T | D_Y |
| TC_030_020 | SR_ODA_CAP- CLI_170 | The Service provider shall be equipped with a mechanism that allows the service provider to configure a Web Portal Service installation to add datasets upon start-up of the WCS client viewer. <i>Note: To be used for instance to allow display of datasets that are the result of Web Coverage Processing Services.</i> | T | D_Y |
| TC_030_020 TC_030_ | SR_ODA_DRC_050 | A WebMapView client software shall be used as WCS client for the demonstration setup. | D | E_Y |
| | SR_ODA_IF- CLI_030 | The WCS client shall support WCS 1.0.0 with the HTTP Get Binding. | D | D_Y |
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| TC03.010 | SR_ODA_IF- CLI_060 | The WCS client shall support the following image formats: <ul style="list-style-type: none"> • GeoTIFF (as per the limitations of SUN JAI libraries in handling TIFFs) • Other coverage formats as supported by the Open Source GDAL library including JPEG2000 (GMLJP2 and GeoJP2) | D | E_Y |
| TC03.030 | SR_ODA_IF- CLI_080 | The WCS client should support the WCS EO Application Profile <i>Note: Extent of support to be confirmed after definition of extension if all aspects of this EO Extension can be covered.</i> | D | D_B |

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| TC_030_030 | SR_ODA_CAP- CLI_140 | If the WCS Service exposes dataset series, the client application will allow to define an AOI and specify the range. Subsequently a list of matching datasets will be shown. | D | E_Y |
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**Heterogeneous Mission Accessibility Follow-On -
Design Justification File - Software Validation Specification**

---- End of Document ----